

=> fil reg  
FILE 'REGISTRY' ENTERED AT 17:21:50 ON 30 AUG 2006  
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.  
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.  
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(FILE 'HOME' ENTERED AT 08:19:40 ON 30 AUG 2006)  
D SAV

FILE 'REGISTRY' ENTERED AT 08:20:48 ON 30 AUG 2006  
ACT WEI272S/A

-----  
L1 SCR 1918  
L2 SCR 1841  
L3 SCR 1968 OR 1958 OR 1938 OR 1985  
L4 STR  
L5 49 SEA SSS SAM L4 NOT (L1 OR L2 OR L3)  
-----  
L6 STR L4  
L7 STR  
L8 42 SEA SSS SAM (L6 NOT L7) NOT (L1 OR L2 OR L3)  
L9 SCR 1312 OR 1707 OR 1526  
L10 36 SEA SSS SAM (L6 NOT L7) NOT (L1 OR L2 OR L3 OR L9)  
L11 STR  
L12 33 SEA SSS SAM (L6 NOT L7 NOT L11) NOT (L1 OR L2 OR L3 OR L9)  
L13 SCR 2026  
L14 31 SEA SSS SAM (L6 NOT L7 NOT L11) NOT (L1 OR L2 OR L3 OR L9 OR L13)  
L15 STR  
L16 30 SEA SSS SAM (L6 NOT L7 NOT L11 NOT L15) NOT (L1 OR L2 OR L3 OR L9 OR L13)  
L17 STR  
L18 30 SEA SSS SAM (L6 NOT L7 NOT L11 NOT L15 NOT L17) NOT (L1 OR L2 OR L3 OR L9 OR L13)  
L19 SCR 1267  
L20 25 SEA SSS SAM (L6 NOT L7 NOT L11 NOT L15 NOT L17) NOT (L1 OR L2 OR L3 OR L9 OR L13 OR L19)  
L21 STR L6  
L22 20 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17) NOT (L1 OR L2 OR L3 OR L9 OR L13 OR L19)  
L23 SCR 1451 OR 1304 OR 1599 OR 1451 OR 1367 OR 2043  
L24 STR  
L25 STR L24  
L26 SCR 1263 OR 1310 OR 1139 OR 1711 OR 1774 OR 1609 OR 1445  
L27 28 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25)  
NOT (L1 OR L2 OR L3 OR L9 OR L13 OR L19 OR L23 OR L26)  
L28 SCR 1199 OR 2016 OR 1481  
L29 28 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25)  
NOT (L1 OR L2 OR L3 OR L9 OR L13 OR L19 OR L23 OR L26 OR L28)  
L30 STR  
L31 26 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25)  
NOT (L1 OR L2 OR L3 OR L9 OR L13 OR L19 OR L23 OR L26 OR L28)  
L32 SCR 1628 OR 1716 OR 1932 OR 1643 OR 2108  
L33 28 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25)  
NOT (L1 OR L2 OR L3 OR L9 OR L13 OR L19 OR L23)

OR L26 OR L28 OR L32)  
 L34 STR  
 L35 19 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25  
 NOT L30 NOT L34) NOT (L1 OR L2 OR L3 OR L9 OR L13 OR L19  
 OR L23 OR L26 OR L28 OR L32)  
 L36 SCR 2040  
 L37 14 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25  
 NOT L30 NOT L34) NOT (L1 OR L2 OR L3 OR L9 OR L13 OR L19  
 OR L23 OR L26 OR L28 OR L32 OR L36)  
 L38 SCR 1116 OR 1257  
 L39 20 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25  
 NOT L30 NOT L34) NOT (L1 OR L2 OR L3 OR L9 OR L13 OR L19  
 OR L23 OR L26 OR L28 OR L32 OR L38)  
 L40 20 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25  
 NOT L30 NOT L34) NOT (L1 OR L2 OR L3 OR L9 OR L13 OR L19  
 OR L23 OR L26 OR L28 OR L32 OR L38 OR L36)  
 L41 9897 SEA SSS SAM (L21 NOT L7 NOT L11 NOT L15 NOT L17 NOT L25  
 NOT L30 NOT L34) NOT (L1 OR L2 OR L3 OR L9 OR L13 OR L19  
 OR L23 OR L26 OR L28 OR L32 OR L38 OR L36)  
 SAV L41 WEI272F26/A

FILE 'HCAPLUS' ENTERED AT 12:55:45 ON 30 AUG 2006  
 E US20040185347/PN  
 L42 1 SEA US2004185347/PN

FILE 'REGISTRY' ENTERED AT 12:56:30 ON 30 AUG 2006  
 L43 54 SEA (463-79-6/BI OR 10377-51-2/BI OR 105-58-8/BI OR  
 L44 5 SEA L43 AND L41

ACT WEI272F1/A  
 -----  
 L45 STR  
 L46 SCR 2043  
 L47 SCR 1064  
 L48 37681 SEA SSS FUL L45 AND L47 NOT L46  
 -----  
 L49 1 SEA L43 AND L48

L50 STR  
 L51 STR  
 L52 1 SEA SSS SAM L50  
 L53 50 SEA SSS SAM L51  
 L54 SCR 1840  
 L55 STR L51  
 L56 50 SEA SSS SAM L55 NOT L54  
 L57 STR L50  
 L58 12332 SEA SSS FUL L55 NOT L54  
 SAV L58 WEI272F45/A  
 L59 STR L50  
 L60 50 SEA SSS SAM L59  
 L61 50 SEA SSS SAM L59 NOT L54  
 L62 50 SEA SSS SAM (L59 NOT L7 NOT L30 NOT L34) NOT (L54 OR L3)  
 L63 50 SEA SSS SAM (L59 NOT L7 NOT L30 NOT L34) NOT (L54 OR L3  
 OR L9 OR L13 OR L19 OR L23 OR L26 OR L28 OR L32 OR L38  
 OR L36)  
 L64 50 SEA SSS SAM (L59 NOT L7 NOT L30 NOT L34) NOT (L54 OR L1  
 OR L3 OR L9 OR L13 OR L19 OR L23 OR L26 OR L28 OR L32 OR  
 L38 OR L36)  
 L65 1699 SEA SSS FUL (L59 NOT L7 NOT L30 NOT L34) NOT (L54 OR L1

OR L3 OR L9 OR L13 OR L19 OR L23 OR L26 OR L28 OR L32 OR  
 L38 OR L36)  
 SAV L65 WEI272F3/A

L66 STR  
 L67 50 SEA SUB=L48 SSS SAM (L66 NOT L54)  
 L68 1222 SEA SUB=L48 SSS FUL (L66 NOT L54)  
 L69 1 SEA L43 AND L68  
 SAV WEI272F1S/A L68

L70 STR L21  
 L71 50 SEA SUB=L41 SSS SAM L70  
 L72 2634 SEA SUB=L41 SSS FUL L70  
 SAV L72 WEI272F2S/A

L73 STR L21  
 L74 50 SEA SUB=L41 SSS SAM L73  
 L75 2262 SEA SUB=L41 SSS FUL L73  
 SAV L75 WEI272F6S/A

L76 4 SEA L43 AND L72  
 L77 1 SEA L43 AND L75  
 L78 3 SEA L43 AND L65  
 L79 STR L55  
 L80 STR L79  
 L81 17 SEA SUB=L58 SSS SAM L80  
 L82 288 SEA SUB=L58 SSS FUL L80  
 SAV L82 WEI272F4S/A

L83 2 SEA L43 AND L82  
 L84 STR L55  
 L85 1 SEA SUB=L58 SSS SAM L84  
 L86 58 SEA SUB=L58 SSS FUL L84  
 SAV L86 WEI272F5S/A

L87 2 SEA L43 AND L86 *Formula*  
 L88 928 SEA L68 AND 1/NC 1  
 L89 2570 SEA L72 AND 1/NC 2  
 L90 1698 SEA L65 AND 1/NC 3  
 L91 123 SEA L82 AND 1/NC 4  
 L92 25 SEA L86 AND 1/NC 5  
 L93 2221 SEA L75 AND 1/NC 6

FILE 'HCAPLUS' ENTERED AT 16:21:21 ON 30 AUG 2006

L94 17472 SEA L88  
 L95 40827 SEA L89  
 L96 8170 SEA L90  
 L97 6839 SEA L91  
 L98 1201 SEA L92  
 L99 27264 SEA L93

FILE 'REGISTRY' ENTERED AT 16:24:10 ON 30 AUG 2006

L100 1 SEA LITHIUM/CN

FILE 'HCAPLUS' ENTERED AT 16:25:34 ON 30 AUG 2006

L101 81718 SEA L100  
 L102 474811 SEA ELECTROLY?

FILE 'REGISTRY' ENTERED AT 16:41:10 ON 30 AUG 2006

L103 20881 SEA LITHIUM SALT  
 L104 4 SEA L43 AND L103

FILE 'HCAPLUS' ENTERED AT 16:42:32 ON 30 AUG 2006

L105 85337 SEA L103 OR (LITHIUM OR LI) (2A) SALT#  
 L106 238813 SEA BATTERY OR BATTERIES OR (ELECTROCHEM? OR ELECTROLY?  
 OR GALVAN? OR WET OR DRY OR PRIMARY OR SECONDARY) (2A) (CEL

L OR CELLS)

L107 83 SEA L94 AND L105  
 L108 6 SEA L107 AND L106  
 L109 2 SEA L108 AND L101  
 L110 2 SEA L109 AND L102  
 L111 6 SEA L108 OR L109 OR L110  
 L112 708 SEA L95 AND L105  
 L113 99 SEA L112 AND L106  
 L114 45 SEA L113 AND L101  
 L115 40 SEA L114 AND L102  
 L116 37 SEA L115 AND (1840-2003)/PY,PRY,AY  
 L117 36 SEA L116 NOT L111  
 L118 70 SEA L90 AND L105  
 L119 6 SEA L118 AND L106  
 L120 2 SEA L119 AND L101  
 L121 2 SEA L120 AND L102  
 L122 6 SEA L119 OR L120 OR L121  
 L123 5 SEA L122 NOT (L111 OR L117)  
 L124 50 SEA L91 AND L105  
 L125 2 SEA L124 AND L106  
 L126 1 SEA L125 AND L101  
 L127 1 SEA L126 AND L102  
 L128 2 SEA L125 OR L126 OR L127  
 L129 0 SEA L128 NOT (L111 OR L117 OR L123)  
 L130 6 SEA L128 OR L111  
 L131 11 SEA L92 AND L105  
 L132 1 SEA L131 AND L106  
 L133 1 SEA L132 AND L101  
 L134 1 SEA L133 AND L102  
 L135 1 SEA L42 AND L134  
 L136 6 SEA L135 OR L111  
 L137 460 SEA L93 AND L105  
 L138 49 SEA L137 AND L106  
 L139 12 SEA L138 AND L101  
 L140 11 SEA L139 AND L102  
 L141 12 SEA L139 OR L140  
 L142 9 SEA L141 NOT (L136 OR L117 OR L123)

=> d 168 que stat  
 L45 STR

4  
 G1 Ak @6 Cb @7  
 } 2  
 Cb ~ C ~ Cb  
 1 } 3  
 G1  
 5

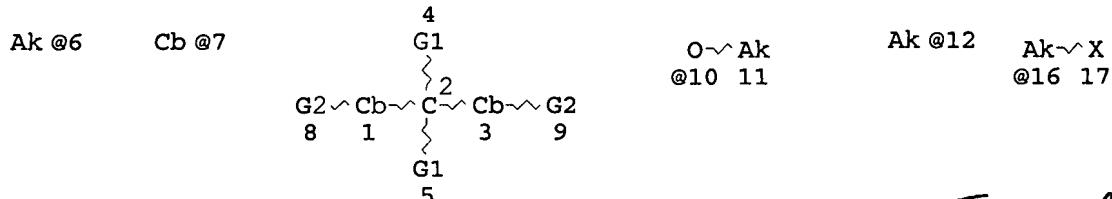
VAR G1=6/7  
 NODE ATTRIBUTES:  
 DEFAULT MLEVEL IS ATOM  
 GGCAT IS UNS AT 1  
 GGCAT IS UNS AT 3  
 GGCAT IS SAT AT 6  
 GGCAT IS UNS AT 7  
 DEFAULT ECLEVEL IS LIMITED  
 ECOUNT IS E6 C AT 1

ECOUNT IS E6 C AT 3

## GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 7

## STEREO ATTRIBUTES: NONE

L46 SCR 2043  
L47 SCR 1064  
L48 37681 SEA FILE=REGISTRY SSS FUL L45 AND L47 NOT L46  
L54 SCR 1840  
L66 STR

Formula (1)

O~Ak~X  
@13 14 15

VAR G1=6/7  
 VAR G2=OH/10/12/16/13  
 NODE ATTRIBUTES:  
 CONNECT IS E1 RC AT 6  
 CONNECT IS E1 RC AT 7  
 CONNECT IS E1 RC AT 11  
 CONNECT IS E1 RC AT 12  
 CONNECT IS E2 RC AT 14  
 CONNECT IS E2 RC AT 16  
 DEFAULT MLEVEL IS ATOM  
 GGCAT IS UNS AT 1  
 GGCAT IS UNS AT 3  
 GGCAT IS SAT AT 6  
 GGCAT IS UNS AT 7  
 GGCAT IS SAT AT 11  
 GGCAT IS UNS AT 12  
 GGCAT IS SAT AT 14  
 GGCAT IS UNS AT 16  
 DEFAULT ECLEVEL IS LIMITED  
 ECOUNT IS E6 C AT 1  
 ECOUNT IS E6 C AT 3

## GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 17

## STEREO ATTRIBUTES: NONE

L68 1222 SEA FILE=REGISTRY SUB=L48 SSS FUL (L66 NOT L54)

100.0% PROCESSED 11518 ITERATIONS  
SEARCH TIME: 00.00.01

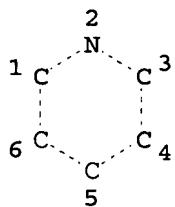
1222 ANSWERS

=> d 172 que stat  
 L1 SCR 1918  
 L2 SCR 1841  
 L3 SCR 1968 OR 1958 OR 1938 OR 1985  
 L7 STR  
 CN 1

NODE ATTRIBUTES:  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
 RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 1

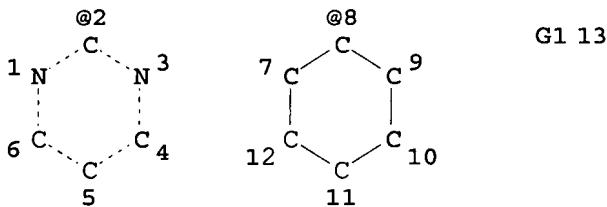
STEREO ATTRIBUTES: NONE  
 L9 SCR 1312 OR 1707 OR 1526  
 L11 STR



NODE ATTRIBUTES:  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
 RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 6

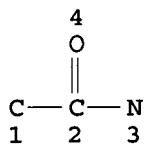
STEREO ATTRIBUTES: NONE  
 L13 SCR 2026  
 L15 STR



VAR G1=2/8  
 NODE ATTRIBUTES:  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
 RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 13

STEREO ATTRIBUTES: NONE  
 L17 STR



## NODE ATTRIBUTES:

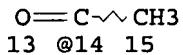
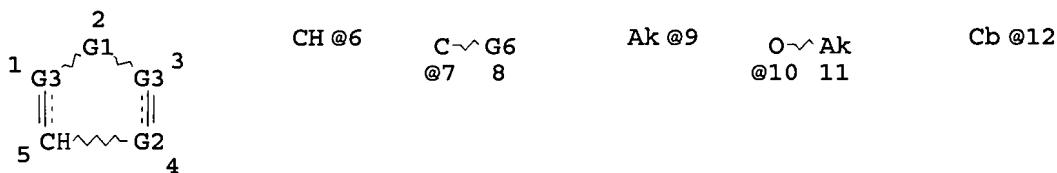
DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

## GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 4

## STEREO ATTRIBUTES: NONE

L19 SCR 1267  
 L21 STR



VAR G1=O/N/S  
 VAR G2=C/N/O/S

VAR G3=6/7

VAR G6=9/10/12/14

## NODE ATTRIBUTES:

CONNECT IS E1 RC AT 9  
 CONNECT IS E1 RC AT 11

CONNECT IS E1 RC AT 12

DEFAULT MLEVEL IS ATOM

GGCAT IS SAT AT 11

GGCAT IS UNS AT 12

DEFAULT ECLEVEL IS LIMITED

ECOUNT IS M1-X8 C AT 9

ECOUNT IS M1-X6 C AT 11

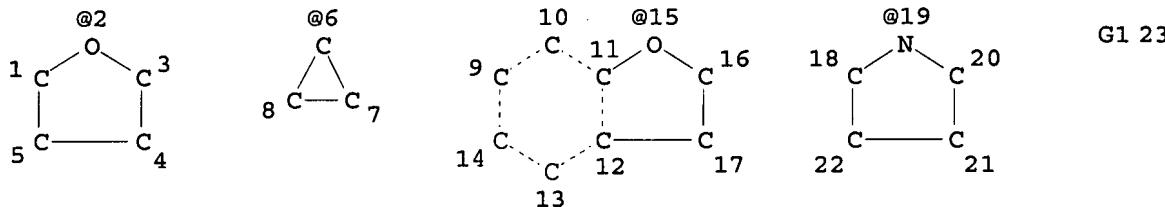
## GRAPH ATTRIBUTES:

RSPEC I

NUMBER OF NODES IS 15

## STEREO ATTRIBUTES: NONE

L23 SCR 1451 OR 1304 OR 1599 OR 1451 OR 1367 OR 2043  
 L25 STR



VAR G1=2/6/15/19

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 23

STEREO ATTRIBUTES: NONE

L26 SCR 1263 OR 1310 OR 1139 OR 1711 OR 1774 OR 1609 OR 1445

L28 SCR 1199 OR 2016 OR 1481

L30 STR

NO2 1

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 1

STEREO ATTRIBUTES: NONE

L32 SCR 1628 OR 1716 OR 1932 OR 1643 OR 2108

L34 STR

OH 1

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

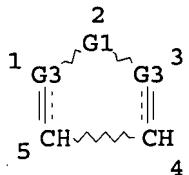
NUMBER OF NODES IS 1

STEREO ATTRIBUTES: NONE

L36 SCR 2040

L38 SCR 1116 OR 1257

L41 9897 SEA FILE=REGISTRY SSS SAM (L21 NOT L7 NOT L11 NOT L15  
NOT L17 NOT L25 NOT L30 NOT L34) NOT (L1 OR L2 OR L3 OR  
L9 OR L13 OR L19 OR L23 OR L26 OR L28 OR L32 OR L38 OR  
L36)  
STR



CH @6

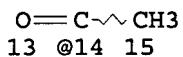
C~ G6  
@7 8

Ak @9

O~ Ak  
@10 11

Cb @12

Formula (2)



VAR G1=O/N/S

VAR G3=6/7

VAR G6=9/10/12/14

NODE ATTRIBUTES:

CONNECT IS E1 RC AT 9

CONNECT IS E1 RC AT 11

CONNECT IS E1 RC AT 12

DEFAULT MLEVEL IS ATOM

GGCAT IS SAT AT 11

GGCAT IS UNS AT 12

DEFAULT ECLEVEL IS LIMITED

ECOUNT IS M1-X8 C AT 9

ECOUNT IS M1-X6 C AT 11

GRAPH ATTRIBUTES:

RSPEC I

NUMBER OF NODES IS 15

STEREO ATTRIBUTES: NONE

L72 2634 SEA FILE=REGISTRY SUB=L41 SSS FUL L70

100.0% PROCESSED 8903 ITERATIONS

2634 ANSWERS

SEARCH TIME: 00.00.01

=&gt; d 165 que stat

L1 SCR 1918

L3 SCR 1968 OR 1958 OR 1938 OR 1985

L7 STR

CN 1

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 1

STEREO ATTRIBUTES: NONE

L9 SCR 1312 OR 1707 OR 1526

L13 SCR 2026

L19 SCR 1267

L23 SCR 1451 OR 1304 OR 1599 OR 1451 OR 1367 OR 2043

L26 SCR 1263 OR 1310 OR 1139 OR 1711 OR 1774 OR 1609 OR 1445  
 L28 SCR 1199 OR 2016 OR 1481  
 L30 STR

NO2 1

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 1

STEREO ATTRIBUTES: NONE

L32 SCR 1628 OR 1716 OR 1932 OR 1643 OR 2108  
 L34 STR

OH 1

NODE ATTRIBUTES:

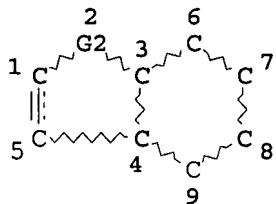
DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 1

STEREO ATTRIBUTES: NONE

L36 SCR 2040  
 L38 SCR 1116 OR 1257  
 L54 SCR 1840  
 L59 STR



Formula(3)

VAR G2=O/N/S

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RSPEC I  
 NUMBER OF NODES IS 9

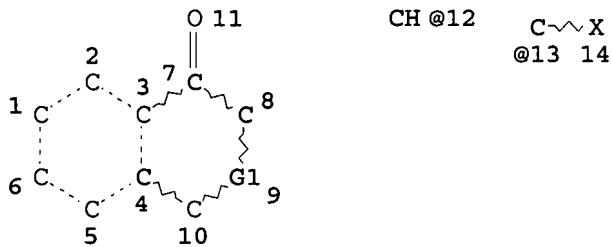
STEREO ATTRIBUTES: NONE

L65 1699 SEA FILE=REGISTRY SSS FUL (L59 NOT L7 NOT L30 NOT L34)  
 NOT (L54 OR L1 OR L3 OR L9 OR L13 OR L19 OR L23 OR L26  
 OR L28 OR L32 OR L38 OR L36)

100.0% PROCESSED 7356 ITERATIONS  
 SEARCH TIME: 00.00.01

1699 ANSWERS

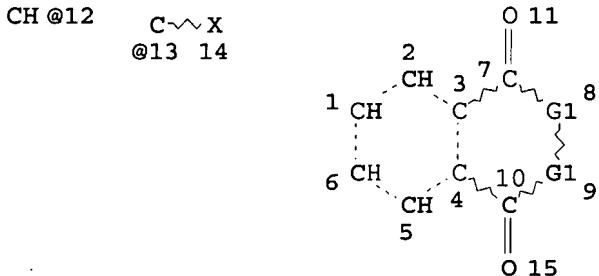
=> d 182 que stat  
 L54 SCR 1840  
 L55 STR



VAR G1=12/13  
 NODE ATTRIBUTES:  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
 RSPEC I  
 NUMBER OF NODES IS 14

STEREO ATTRIBUTES: NONE  
 L58 12332 SEA FILE=REGISTRY SSS FUL L55 NOT L54  
 L80 STR



Formula (4)

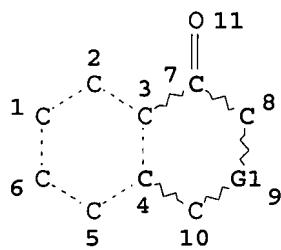
VAR G1=12/13  
 NODE ATTRIBUTES:  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
 RSPEC I  
 NUMBER OF NODES IS 15

STEREO ATTRIBUTES: NONE  
 L82 288 SEA FILE=REGISTRY SUB=L58 SSS FUL L80

100.0% PROCESSED 7289 ITERATIONS 288 ANSWERS  
 SEARCH TIME: 00.00.01

=> d 186 que stat  
 L54 SCR 1840  
 L55 STR



CH @12      C~X  
              @13 14

VAR G1=12/13

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

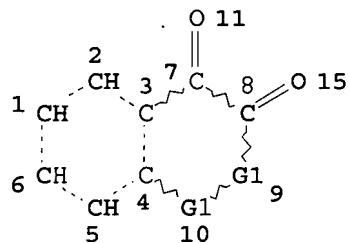
RSPEC I

NUMBER OF NODES IS 14

STEREO ATTRIBUTES: NONE

L58            12332 SEA FILE=REGISTRY SSS FUL L55 NOT L54  
L84            STR

CH @12      C~X  
              @13 14



Formula (5)

VAR G1=12/13

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RSPEC I

NUMBER OF NODES IS 15

STEREO ATTRIBUTES: NONE

L86            58 SEA FILE=REGISTRY SUB=L58 SSS FUL L84

100.0% PROCESSED    2578 ITERATIONS  
SEARCH TIME: 00.00.01

58 ANSWERS

=> d 175 que stat  
L1            SCR 1918  
L2            SCR 1841  
L3            SCR 1968 OR 1958 OR 1938 OR 1985  
L7            STR  
CN 1

## NODE ATTRIBUTES:

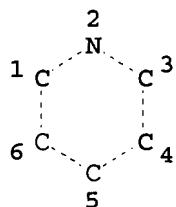
DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

## GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 1

## STEREO ATTRIBUTES: NONE

L9 SCR 1312 OR 1707 OR 1526  
 L11 STR



## NODE ATTRIBUTES:

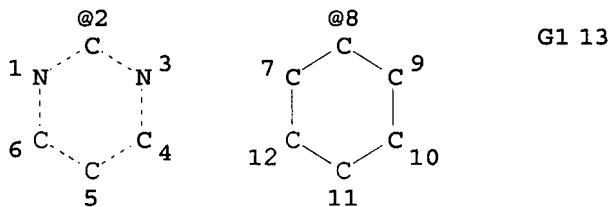
DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

## GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 6

## STEREO ATTRIBUTES: NONE

L13 SCR 2026  
 L15 STR



VAR G1=2/8

## NODE ATTRIBUTES:

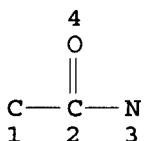
DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

## GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 13

## STEREO ATTRIBUTES: NONE

L17 STR



## NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

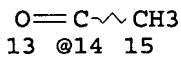
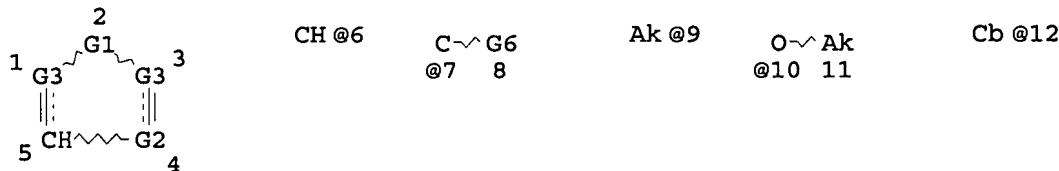
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 4

STEREO ATTRIBUTES: NONE

L19 SCR 1267  
L21 STR



VAR G1=O/N/S  
VAR G2=C/N/O/S

VAR G3=6/7

VAR G6=9/10/12/14

NODE ATTRIBUTES:

CONNECT IS E1 RC AT 9

CONNECT IS E1 RC AT 11

CONNECT IS E1 RC AT 12

DEFAULT MLEVEL IS ATOM

GGCAT IS SAT AT 11

GGCAT IS UNS AT 12

DEFAULT ECLEVEL IS LIMITED

ECOUNT IS M1-X8 C AT 9

ECOUNT IS M1-X6 C AT 11

GRAPH ATTRIBUTES:

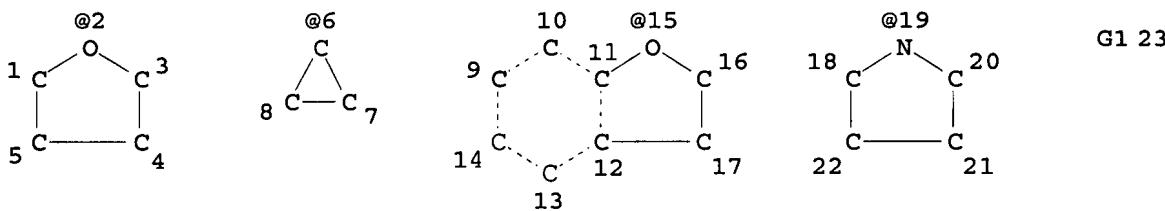
RSPEC I

NUMBER OF NODES IS 15

STEREO ATTRIBUTES: NONE

L23 SCR 1451 OR 1304 OR 1599 OR 1451 OR 1367 OR 2043

L25 STR



VAR G1=2/6/15/19

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 23

STEREO ATTRIBUTES: NONE

L26 SCR 1263 OR 1310 OR 1139 OR 1711 OR 1774 OR 1609 OR 1445  
 L28 SCR 1199 OR 2016 OR 1481  
 L30 STR

NO2 1

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 1

STEREO ATTRIBUTES: NONE

L32 SCR 1628 OR 1716 OR 1932 OR 1643 OR 2108  
 L34 STR

OH 1

NODE ATTRIBUTES:

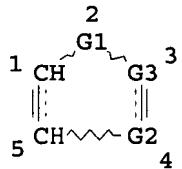
DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 1

STEREO ATTRIBUTES: NONE

L36 SCR 2040  
 L38 SCR 1116 OR 1257  
 L41 9897 SEA FILE=REGISTRY SSS SAM (L21 NOT L7 NOT L11 NOT L15  
 NOT L17 NOT L25 NOT L30 NOT L34) NOT (L1 OR L2 OR L3 OR  
 L9 OR L13 OR L19 OR L23 OR L26 OR L28 OR L32 OR L38 OR  
 L36)  
 L73 STR



CH @6      C~ G6      Ak @9      O~ Ak      Cb @12  
 @7    8      @10 11

Formula (6)

O=C~CH3  
 13 @14 15

VAR G1=O/N/S  
 VAR G2=N/O/S  
 VAR G3=6/7  
 VAR G6=9/10/12/14  
 NODE ATTRIBUTES:  
 CONNECT IS E1 RC AT 9  
 CONNECT IS E1 RC AT 11  
 CONNECT IS E1 RC AT 12

DEFAULT MLEVEL IS ATOM  
 GGCAT IS SAT AT 11  
 GGCAT IS UNS AT 12  
 DEFAULT ECLEVEL IS LIMITED  
 ECOUNT IS M1-X8 C AT 9  
 ECOUNT IS M1-X6 C AT 11

GRAPH ATTRIBUTES:

RSPEC I  
 NUMBER OF NODES IS 15

STEREO ATTRIBUTES: NONE

L75 2262 SEA FILE=REGISTRY SUB=L41 SSS FUL L73

100.0% PROCESSED 9897 ITERATIONS  
 SEARCH TIME: 00.00.01

2262 ANSWERS

=> fil hcap  
 FILE 'HCAPLUS' ENTERED AT 17:25:14 ON 30 AUG 2006  
 USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.  
 PLEASE SEE "HELP USAGETERMS" FOR DETAILS.  
 COPYRIGHT (C) 2006 AMERICAN CHEMICAL SOCIETY (ACS)

=> d 1136 ibib abs hitstr hitind 1-6

L136 ANSWER 1 OF 6 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2005:394066 HCAPLUS  
 DOCUMENT NUMBER: 142:433099  
 TITLE: Electrolyte for rechargeable lithium  
 battery  
 INVENTOR(S): Kim, Jin-Hee; Kim, Jin-Sung  
 PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea  
 SOURCE: Eur. Pat. Appl., 50 pp.  
 CODEN: EPXXDW  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1528616	A2	20050504	EP 2004-90417	200411 01
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK, HR, IS, YU				
KR 2005041859	A	20050504	KR 2004-65773	200408 20
JP 2005142157	A2	20050602	JP 2004-318586	200411 01
US 2005142448	A1	20050630	US 2004-980116	200411

CN 1770541	A	20060510	CN 2004-10104744	01
				200411
PRIORITY APPLN. INFO.:			KR 2003-76913	01
				200310
				31
			KR 2004-65773	A
				200408
				20

OTHER SOURCE(S) : MARPAT 142:433099

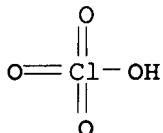
AB Disclosed is an **electrolyte** for a rechargeable lithium **battery** including: a first additive having an oxidn. potential of 4.1 to 4.6 V; a second additive having an oxidn. potential of 4.4 to 5.0 V; and a nonaq. org. solvent; and a **lithium salt**.

IT 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 33454-82-9, Lithium triflate 90076-65-6 132843-44-8  
RL: DEV (Device component use); USES (Uses)  
(**electrolyte** for rechargeable lithium **battery**)

RN 7439-93-2 HCPLUS  
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

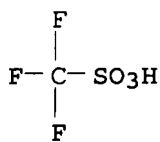
Li

RN 7791-03-9 HCPLUS  
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



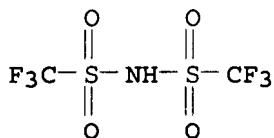
● Li

RN 33454-82-9 HCPLUS  
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



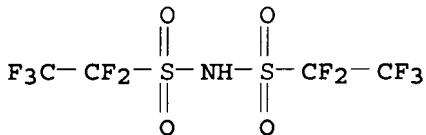
## ● Li

RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



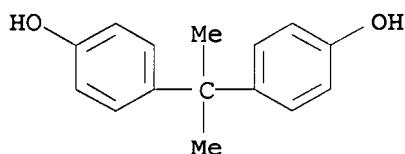
## ● Li

RN 132843-44-8 HCAPLUS  
 CN Ethanesulfonamide, 1,1,2,2,2-pentafluoro-N-[(pentafluoroethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



## ● Li

IT 80-05-7, Bisphenol A, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (electrolyte for rechargeable lithium **battery**)  
 )  
 RN 80-05-7 HCAPLUS  
 CN Phenol, 4,4'-(1-methylethylidene)bis- (9CI) (CA INDEX NAME)



IC ICM H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38

ST **electrolyte rechargeable lithium battery**

IT Alkenes, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (C2-8, copolymer with propylene; **electrolyte for rechargeable lithium battery**)

IT **Battery electrolytes**  
 (**electrolyte for rechargeable lithium battery**)

IT Aromatic hydrocarbons, uses  
 Esters, uses  
 Ethers, uses  
 Ketones, uses  
 RL: DEV (Device component use); USES (Uses)  
 (**electrolyte for rechargeable lithium battery**)

IT Fluoropolymers, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (**electrolyte for rechargeable lithium battery**)

IT Styrene-butadiene rubber, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (**electrolyte for rechargeable lithium battery**)

IT Secondary batteries  
 (lithium; **electrolyte for rechargeable lithium battery**)

IT 71-43-2, Benzene, uses 96-49-1, Ethylene carbonate 98-95-3,  
 Nitrobenzene, uses 105-58-8, Diethyl carbonate 108-32-7,  
 Propylene carbonate 108-88-3, Toluene, uses 108-90-7,  
 Chlorobenzene, uses 462-06-6, Fluorobenzene 463-79-6D, Carbonic  
 acid, ester 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl  
 carbonate 623-96-1, Dipropyl carbonate 1330-20-7, Xylene, uses  
 4437-85-8, Butylene carbonate 7439-93-2, Lithium, uses  
 7440-44-0, Carbon, uses 7447-41-8, Lithium chloride, uses  
 7791-03-9, Lithium perchlorate 10377-51-2, Lithium iodide  
 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>) 14024-11-4, Lithium  
 tetrachloroaluminate 14283-07-9, Lithium tetrafluoroborate  
 18424-17-4, Lithium hexafluoroantimonate 21324-40-3, Lithium  
 hexafluorophosphate 25496-08-6, Fluorotoluene 27359-10-0,  
 Trifluorotoluene 29935-35-1, Lithium hexafluoroarsenate  
 33454-82-9, Lithium triflate 35363-40-7, Ethyl propyl  
 carbonate 37220-89-6, Aluminum lithium oxide 56525-42-9, Methyl  
 propyl carbonate 90076-65-6 132843-44-8  
 RL: DEV (Device component use); USES (Uses)  
 (**electrolyte for rechargeable lithium battery**)

IT 79-41-4D, Methacrylic acid, copolymer with methacrylic alkyl ester  
 80-05-7, Bisphenol A, uses 80-09-1, Bisphenol S  
 106-38-7, 4-Bromotoluene 106-43-4, 4-Chlorotoluene 115-07-1D,  
 Propylene, copolymer with C2-8 olefin 352-32-9, 4-Fluorotoluene  
 530-48-3, 1,1-Diphenyl ethylene 772-00-9, 4-Phenyl-1,3-dioxane  
 843-55-0, 4,4'-Cyclohexylidene bisphenol 1075-20-3,  
 4-Phenyl-1,3-dioxolane 1478-61-1, 4,4'-  
 (Hexafluoroisopropylidene)diphenol 9000-11-7 9003-39-8,  
 Polyvinylpyrrolidone 9004-34-6D, Cellulose, compds. 9004-57-3,  
 Ethyl cellulose 9004-62-0 9004-64-2, Hydroxypropyl cellulose  
 9004-65-3, Hydroxypropyl methyl cellulose 9004-67-5, Methyl  
 cellulose 9062-14-0, Ethyl hydroxypropyl cellulose 10192-62-8,

Bisphenol A diacetate 24937-79-9, PVDF 25549-84-2, Polysodium acrylate

RL: MOA (Modifier or additive use); USES (Uses)  
(electrolyte for rechargeable lithium battery  
)

IT 9003-55-8

RL: MOA (Modifier or additive use); USES (Uses)  
(styrene-butadiene rubber; electrolyte for rechargeable lithium battery)

L136 ANSWER 2 OF 6 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:932030 HCAPLUS

DOCUMENT NUMBER: 141:398152

TITLE: Electrolyte solution for secondary lithium battery and the battery

INVENTOR(S): Kim, Jin Hee; Kim, Jin Sung; Hwang, Sang Moon;  
Baek, Ho Sung; Kim, Hak Soo

PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea

SOURCE: Jpn. Kokai Tokkyo Koho, 19 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2004311442	A2	20041104	JP 2004-111392	200404 05
KR 2004086920	A	20041013	KR 2003-21110	200304 03
US 2004259002	A1	20041223	US 2004-817761	200404 02
CN 1540794	A	20041027	CN 2004-10038747	200404 05
PRIORITY APPLN. INFO.:			KR 2003-21110	A 200304 03

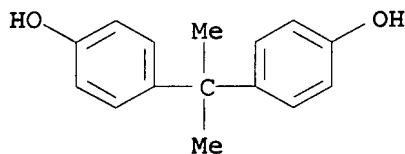
AB The electrolyte soln. contains a Li salt, a nonaq. org. solvent, and an additive having a decompn. starting voltage 4-5 V and a const. current in a  $\geq 0.5$  V wide range on its linear sweep voltammogram. The additive is selected from bisphenol A, 2,5-dimethylfuran, 2,3-dichloro-1,4-naphthoquinone. The battery has suppressed gas formation when stored at high temps., and has improved safety when overcharged.

IT 80-05-7, Bisphenol A, uses

RL: MOA (Modifier or additive use); USES (Uses)  
(additives in electrolyte solns. in secondary lithium batteries for safety and high temp. storing performance)

RN 80-05-7 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis- (9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 ICS H01M004-02; H01M004-58  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST secondary lithium **battery** electrolyte additive safety  
 IT **Battery** electrolytes  
 Safety  
 (electrolyte solns. contg. additives in secondary lithium  
**batteries** for safety and high temp. storing performance)  
 IT Secondary batteries  
 (lithium; electrolyte solns. contg. additives in secondary  
 lithium **batteries** for safety and high temp. storing  
 performance)  
 IT 80-05-7, Bisphenol A, uses 117-80-6, 2,3-Dichloro-1,4-  
 naphthoquinone 625-86-5, 2,5-Dimethylfuran  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (additives in electrolyte solns. in secondary lithium  
**batteries** for safety and high temp. storing performance)  
 IT 96-49-1, Ethylene carbonate 623-53-0, Ethyl methyl carbonate  
 21324-40-3, Lithium hexafluorophosphate  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte solns. contg. additives in secondary lithium  
**batteries** for safety and high temp. storing performance)

L136 ANSWER 3 OF 6 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2004:796490 HCAPLUS  
 DOCUMENT NUMBER: 141:263480  
 TITLE: A nonaqueous electrolyte for a lithium secondary  
**battery**  
 INVENTOR(S): Noh, Hyeong-Gon; Jung, Cheol-Soo; Song, Eui-Hwan  
 PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea  
 SOURCE: Eur. Pat. Appl., 25 pp.  
 CODEN: EPXXDW  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1463143	A2	20040929	EP 2003-90265	200308 21
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
KR 2004083670	A	20041006	KR 2003-18226	200303 24
JP 2005108440	A2	20050421	JP 2003-183257	200306 26

CN 1532986	A	20040929	CN 2003-155677	
				200309
				02
US 2004197667	A1	20041007	US 2003-653192	
				200309
				03
PRIORITY APPLN. INFO.:			KR 2003-18226	A
				200303
				24

OTHER SOURCE(S): MARPAT 141:263480

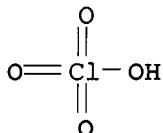
AB An electrolyte of a lithium secondary **battery** includes lithium salts, an org. solvent with a high b.p., and a carbonate-based additive compd. having substituents selected from the group consisting of a halogen, a CN, and a NO<sub>2</sub>. The electrolyte improves discharge, low temp., and cycle life characteristics of a lithium secondary **battery**.

IT 7791-03-9, Lithium perchlorate 33454-82-9, Lithium triflate 90076-65-6 131651-65-5

RL: DEV (Device component use); USES (Uses)  
(nonaq. electrolyte for lithium secondary **battery**)

RN 7791-03-9 HCPLUS

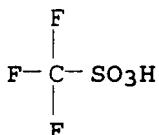
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 33454-82-9 HCPLUS

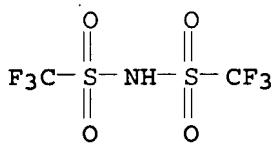
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

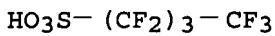
RN 90076-65-6 HCPLUS

CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



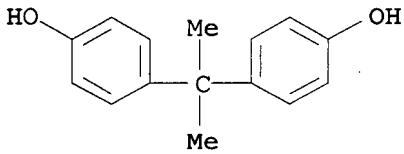
● Li

RN 131651-65-5 HCAPLUS  
 CN 1-Butanesulfonic acid, 1,1,2,2,3,3,4,4,4-nonafluoro-, lithium salt  
 (9CI) (CA INDEX NAME)



● Li

IT 80-05-7, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte for lithium secondary **battery**)  
 RN 80-05-7 HCAPLUS  
 CN Phenol, 4,4'-(1-methylethylidene)bis- (9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST nonaq electrolyte lithium secondary **battery**  
 IT Secondary **batteries**  
 (lithium; nonaq. electrolyte for lithium secondary  
**battery**)  
 IT **Battery** electrolytes  
 (nonaq. electrolyte for lithium secondary **battery**)  
 IT Anhydrides  
 Aromatic hydrocarbons, uses  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. electrolyte for lithium secondary **battery**)  
 IT Fluoropolymers, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte for lithium secondary **battery**)  
 IT Styrene-butadiene rubber, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte for lithium secondary **battery**)  
 IT 67-68-5, Dmso, uses 68-12-2, Dmf, uses 71-43-2, Benzene, uses  
 75-05-8, Acetonitrile, uses 79-16-3, N-Methylacetamide 96-48-0,  
 $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 105-58-8,  
 Diethyl carbonate 108-32-7, Propylene carbonate 108-88-3,

Toluene, uses 123-39-7, n-Methylformamide 126-33-0, Sulfolane 462-06-6, Fluorobenzene 616-38-6, Dimethyl carbonate 616-42-2, Dimethyl sulfite 623-53-0, Methyl ethyl carbonate 623-96-1, Dipropyl carbonate 872-50-4, N-Methylpyrrolidone, uses 1330-20-7, Xylene, uses 4437-85-8, Butylene carbonate 7447-41-8, Lithium chloride, uses 7782-42-5, Graphite, uses 7791-03-9, Lithium perchlorate 10377-51-2, Lithium iodide 12003-67-7 14024-11-4, Lithium tetrachloroaluminate 14283-07-9, Lithium tetrafluoroborate 18424-17-4, Lithium hexafluoroantimonate 21324-40-3, Lithium hexafluorophosphate 25496-08-6, Fluorotoluene 27359-10-0, TriFluorotoluene 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate 35363-40-7, Ethyl propyl carbonate 56525-42-9, Methyl propyl carbonate 90076-65-6 131651-65-5 162684-16-4, Lithium manganese nickel oxide

RL: DEV (Device component use); USES (Uses)

(nonaq. electrolyte for lithium secondary **battery**)

IT 67-71-0, Methyl sulfone 77-77-0, Vinyl sulfone 80-05-7, uses 104-92-7, 4-Bromoanisole 127-63-9, Phenyl sulfone 452-10-8, 2,4-Difluoroanisole 456-49-5, 3-Fluoroanisole 459-60-9, 4-Fluoroanisole 463-79-6D, Carbonic acid, cyclic ester 620-32-6, Benzyl sulfone 623-12-1, 4-Chloroanisole 1073-05-8, 1,3-Propanediol cyclic sulfate 1120-71-4, Propane sultone 1888-91-1, n-Acetylcaprolactam 1889-59-4, Ethyl vinyl sulfone 2398-37-0, 3-Bromoanisole 2845-89-8, 3-Chloroanisole 3680-02-2, Methyl vinyl sulfone 5535-48-8, Phenyl vinyl sulfone 24937-79-9, Pvdf 28452-93-9, Butadiene sulfone 28802-49-5, Dimethylfuran 93343-10-3, 3,5-Difluoroanisole 114435-02-8, Fluoroethylene carbonate 202925-08-4, 3-Chloro-5-fluoroanisole 756901-22-1 756901-23-2

RL: MOA (Modifier or additive use); USES (Uses)

(nonaq. electrolyte for lithium secondary **battery**)

IT 9003-55-8  
RL: MOA (Modifier or additive use); USES (Uses)  
(styrene-butadiene rubber; nonaq. electrolyte for lithium secondary **battery**)

L136 ANSWER 4 OF 6 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:753254 HCAPLUS

DOCUMENT NUMBER: 141:228183

TITLE: A nonaqueous **electrolyte** for lithium secondary **battery**

INVENTOR(S): Kim, Jin-Hee; Kim, Jin-Sung; Hwang, Sang-Moon; Paik, Meen-Seon; Kim, Hak-Soo

PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea; Cheil Industries Inc.

SOURCE: Eur. Pat. Appl., 33 pp.  
CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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EP 1458048	A1	20040915	EP 2003-90262	200308 21

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,

PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU,  
SK

KR 2004080775	A	20040920	KR 2003-15749	200303 13
JP 2005108439	A2	20050421	JP 2003-183239	200306 26
CN 1531134	A	20040922	CN 2003-155332	200308 27
US 2004185347	A1	20040923	US 2003-658272	200309 10

PRIORITY APPLN. INFO.: KR 2003-15749 A  
<--  
200303  
13

OTHER SOURCE(S): MARPAT 141:228183

AB An electrolyte for a lithium secondary battery includes lithium salts, a nonaq. org. solvent, and additive compds. The additive compds. added to the electrolyte of the present invention decomp. earlier than the org. solvent to form a conductive polymer layer on the surface of a pos. electrode, and prevent decompn. of the org. solvent. Accordingly, the electrolyte inhibits gas generation caused by decompn. of the org. solvent at initial charging, and thus reduces an increase of internal pressure and swelling during high temp. storage, and also improves safety of the battery during overcharge.

IT 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 33454-82-9, Lithium triflate 90076-65-6 131651-65-5, Lithium nonafluorobutanesulfonate

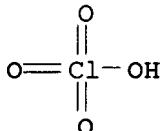
RL: DEV (Device component use); USES (Uses)  
(nonaq. electrolyte for lithium secondary  
battery)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

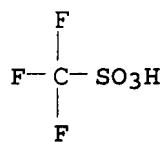
Li

RN 7791-03-9 HCAPLUS  
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



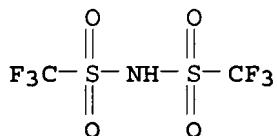
● Li

RN 33454-82-9 HCAPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

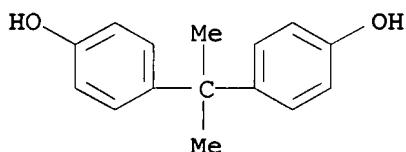
RN 131651-65-5 HCAPLUS  
 CN 1-Butanesulfonic acid, 1,1,2,2,3,3,4,4,4-nonafluoro-, lithium salt (9CI) (CA INDEX NAME)



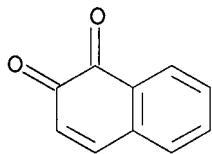
● Li

IT 80-05-7, Bisphenol A, uses 524-42-5,  
 1,2-Naphthoquinone 7474-83-1, 3-Bromo-1,2-naphthoquinone  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte for lithium secondary  
 battery)

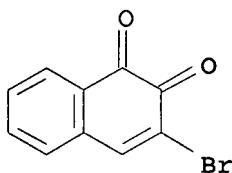
RN 80-05-7 HCAPLUS  
 CN Phenol, 4,4'-(1-methylethylidene)bis- (9CI) (CA INDEX NAME)



RN 524-42-5 HCAPLUS  
 CN 1,2-Naphthalenedione (9CI) (CA INDEX NAME)



RN 7474-83-1 HCAPLUS  
 CN 1,2-Naphthalenedione, 3-bromo- (9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST nonaq **electrolyte** lithium secondary **battery**;  
 safety nonaq **electrolyte** lithium secondary **battery**  
 IT Secondary batteries  
 (lithium; nonaq. **electrolyte** for lithium secondary  
 battery)  
 IT **Battery electrolytes**  
 Conducting polymers  
 Safety  
 Swelling, physical  
 (nonaq. **electrolyte** for lithium secondary  
 battery)  
 IT Aromatic hydrocarbons, uses  
 Esters, uses  
 Ethers, uses  
 Ketones, uses  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. **electrolyte** for lithium secondary  
 battery)  
 IT Lithium alloy, base  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. **electrolyte** for lithium secondary  
 battery)  
 IT 67-71-0, Methylsulfone 71-43-2, Benzene, uses 77-77-0,  
 Vinylsulfone 96-49-1, Ethylene carbonate 105-58-8, Diethyl  
 carbonate 108-32-7, Propylene carbonate 108-88-3, Toluene, uses  
 126-33-0, Tetramethylene sulfone 127-63-9, Phenylsulfone  
 462-06-6, Fluorobenzene 463-79-6D, Carbonic acid, chain ester  
 463-79-6D, Carbonic acid, cyclic ester 463-79-6D, Carbonic acid,  
 ester 616-38-6, Dimethyl carbonate 620-32-6, Benzylsulfone  
 623-53-0, Methyl ethyl carbonate 623-96-1, Dipropyl carbonate  
 1330-20-7, Xylene, uses 1889-59-4, Ethylvinylsulfone 3680-02-2,  
 Methylvinylsulfone 4437-85-8, Butylene carbonate 5535-43-3,  
 m-Chlorophenyl vinyl sulfone 5535-48-8, Phenylvinylsulfone  
 7439-93-2, Lithium, uses 7447-41-8, Lithium chloride

(LiCl), uses 7791-03-9, Lithium perchlorate 10377-51-2, Lithium iodide 14024-11-4, Aluminum lithium chloride AlLiCl4 14283-07-9, Lithium tetrafluoroborate 18424-17-4, Lithium hexafluoroantimonate 21324-40-3, Lithium hexafluorophosphate 27359-10-0, Trifluorotoluene 28122-14-7, p-FluoroPhenyl vinyl sulfone 28452-93-9, Butadiene sulfone 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate 35363-40-7, Ethyl propyl carbonate 37220-89-6, Aluminum lithium oxide 39300-70-4, Lithium nickel oxide 56525-42-9, Methyl propyl carbonate 90076-65-6 131651-65-5, Lithium nonafluorobutanesulfonate 162684-16-4, Lithium manganese nickel oxide

RL: DEV (Device component use); USES (Uses)  
(nonaq. electrolyte for lithium secondary battery)

IT 80-05-7, Bisphenol A, uses 95-15-8, Thianaphthene 117-80-6, 2,3-Dichloro-1,4-naphthoquinone 271-89-6, 2,3-Benzofuran 524-42-5, 1,2-Naphthoquinone 625-86-5, 2,5-Dimethylfuran 693-98-1, 2-Methylimidazole 1192-62-7, 2-Acetyl furan 1193-79-9, 2-Acetyl-5-methylfuran 4265-27-4, 2-Butylbenzofuran 7474-83-1, 3-Bromo-1,2-naphthoquinone 13243-65-7, 2,3-Dibromo-1,4-naphthoquinone 16851-82-4, 1-(Phenylsulfonyl)pyrrole

RL: MOA (Modifier or additive use); USES (Uses)  
(nonaq. electrolyte for lithium secondary battery)

REFERENCE COUNT: 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L136 ANSWER 5 OF 6 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2001:847742 HCAPLUS  
DOCUMENT NUMBER: 136:9010  
TITLE: Solid polymer electrolyte  
INVENTOR(S): Ogawa, Noriyoshi; Kanekawa, Tatsuya  
PATENT ASSIGNEE(S): Mitsubishi Gas Chemical Co., Ltd., Japan  
SOURCE: Jpn. Kokai Tokkyo Koho, 11 pp.  
CODEN: JKXXAF  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001325990	A2	20011122	JP 2000-141683	200005 15
PRIORITY APPLN. INFO.:			JP 2000-141683	200005 15

GI

\* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT \*

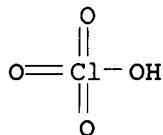
AB The electrolyte contains an ionizable Group I or Group II metal salt and a copolymer, having limiting viscosity 0.2-2.0 dL/g, and contg. repeating units I (R1-4 = H, C1-10 alkyl, C6-12 aryl, C2-5 alkenyl, C1-5 alkoxy, or C7-17 aralkyl groups and may have C1-5 alkyl, C2-5 alkenyl, or C1-5 alkoxy substituents; X = -(CR5R6)n-, -S-, -SO2-, -O-, -CO-, -SO-, II, or III; R5-6 = H, C1-10 alkyl, C6-12 aryl, C2-5 alkenyl, or C1-5 alkoxy groups that may contain C1-5 alkyl, C2-5 alkenyl or C1-5 alkoxy substituents, or R5 and R6 joined to form a (heterocyclic) ring; R7-8 = H, C1-10 alkyl, C2-10 alkenyl, C1-10 alkoxy, or C6-12 aryl group; a = 0-20 integer) and 20-70 mol% IV (R9-10 = H, C1-5 alkyl, C6-12 aryl, C2-5 alkenyl, C1-5 alkoxy, C7-17 aralkyl groups and may have C1-5 alkyl, C2-5 alkenyl, or C1-5 alkoxy substituents; R11-14= H, C1-5 alkyl, C6-12 aryl, C2-5 alkenyl, C1-5 alkoxy, C7-17 aralkyl groups and may have C1-5 alkyl, C2-5 alkenyl, or C1-5 alkoxy substituents; R15 = C1-6 alkylene group, alkylidene group, or single bond; Y = polymer or random copolymer of -SiR16R17O- and/or -SiR18R19O- having d.p. 0-200, R16-19 = H, C1-5 alkyl, C6-12 aryl, C2-5 alkenyl, C1-5 alkoxy, C7-17 aralkyl groups and may have C1-5 alkyl, C2-5 alkenyl, or C1-5 alkoxy substituents). The electrolyte is useful for **batteries**.

IT 7791-03-9, Lithium perchlorate

RL: DEV (Device component use); USES (Uses)  
(compns. of solid polymer electrolyte contg. carbonate ester-siloxane copolymer for secondary lithium **batteries**)

RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

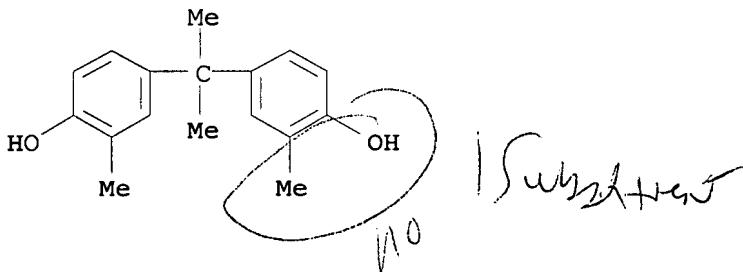
IT 79-97-0, 2,2-Bis(4-hydroxy-3-methylphenyl)propane

80-05-7, 2,2-Bis(4-hydroxyphenyl)propane, processes

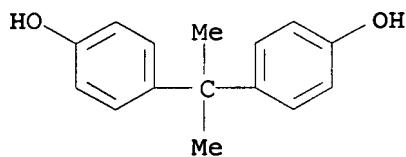
RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(in manuf. of solid polymer electrolyte contg. carbonate ester-siloxane copolymer for secondary lithium **batteries**)

RN 79-97-0 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis[2-methyl- (9CI) (CA INDEX NAME)



RN 80-05-7 HCAPLUS  
 CN Phenol, 4,4'-(1-methylethylidene)bis- (9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 ICS C08G064-04; C08K003-00; C08L069-00; H01B001-06  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST battery carbonate siloxane copolymer electrolyte compn  
 IT Battery electrolytes  
 (compns. of solid polymer electrolyte contg. carbonate  
 ester-siloxane copolymer for secondary lithium batteries  
 )  
 IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate  
 7791-03-9, Lithium perchlorate 158626-68-7 163111-96-4  
 375369-96-3 375369-98-5  
 RL: DEV (Device component use); USES (Uses)  
 (compns. of solid polymer electrolyte contg. carbonate  
 ester-siloxane copolymer for secondary lithium batteries  
 )  
 IT 75-44-5, Phosgen 79-97-0, 2,2-Bis(4-hydroxy-3-  
 methylphenyl)propane 80-05-7, 2,2-Bis(4-  
 hydroxyphenyl)propane, processes 843-55-0, 1,1-Bis(4-  
 hydroxyphenyl)cyclohexane 1571-75-1, 1,1-Bis(4-hydroxyphenyl)-1-  
 phenyl ethane 7775-14-6, Sodium hydrosulfite 27955-94-8,  
 1,1,1-Tris(4-hydroxyphenyl)ethane 88938-12-9, 9,9-Bis(4-hydroxy-3-  
 methylphenyl)fluorene 158167-48-7  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (in manuf. of solid polymer electrolyte contg. carbonate  
 ester-siloxane copolymer for secondary lithium batteries  
 )

L136 ANSWER 6 OF 6 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 1992:110013 HCAPLUS  
 DOCUMENT NUMBER: 116:110013  
 TITLE: Ionic conductivity of epoxy network/polyethylene  
 glycol-lithium perchlorate complex IPN system  
 AUTHOR(S): Peng, Xinsheng; Song, Yongxian; Qi, Yuchen; Wu,  
 Shuyun; Li, Lixia; Chen, Donglin  
 CORPORATE SOURCE: Changchun Inst. Appl. Chem., Acad. Sin.,  
 Changchun, Peop. Rep. China  
 SOURCE: Chinese Journal of Polymer Science (1990), 8(4),  
 342-6  
 CODEN: CJPSEG; ISSN: 0256-7679

DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB To prep. a polymeric solid electrolyte with both high ionic cond. at  
 ambient temp. and adequate mech. strength, an ionic conducting IPN  
 (interpenetrating networks) composed of bisphenol A epoxy  
 resin/polyethylene glycol contg. LiClO<sub>4</sub> was synthesized. The  
 dependence of cond. was investigated as a function of salt content,  
 compn., and temp. A max. of cond. appeared when EO/Li = 25, where  
 EO denotes the -CH<sub>2</sub>CH<sub>2</sub>O - unit in polyethylene glycol. The temp.  
 dependence of cond. followed Vogel-Tamman-Fulcher equation, using

that the motion of ionic carriers resulted from the segmental motion of the polymer. When glycerol epoxy resin was used instead of bisphenol A epoxy, the ambient temp. (25) cond. could somewhat further be raised 3 + 10<sup>-5</sup> S/cm.

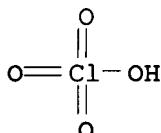
IT 7791-03-9, Lithium perchlorate

RL: USES (Uses)

(interpenetrating network contg. epoxy resins and, ionic cond. of)

RN 7791-03-9 HCPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

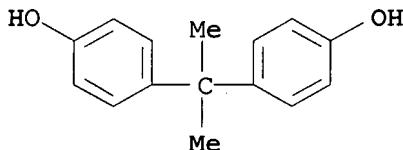
IT 80-05-7D, epoxy resin

RL: USES (Uses)

(interpenetrating network contg., ionic cond. of)

RN 80-05-7 HCPLUS

CN Phenol, 4,4'-(1-methylethyldene)bis- (9CI) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 37, 38, 76

ST ionic cond epoxy interpenetrating network; polyethylene glycol interpenetrating network epoxy; lithium perchlorate interpenetrating network epoxy; battery polymer electrolyte interpenetrating network epoxy

IT Battery electrolytes

(epoxy network/polyethylene glycol-lithium perchlorate system, ionic cond. of)

IT 7791-03-9, Lithium perchlorate 25322-68-3

RL: USES (Uses)

(interpenetrating network contg. epoxy resins and, ionic cond. of)

IT 56-81-5D, Glycerol, epoxy resin 80-05-7D, epoxy resin

RL: USES (Uses)

(interpenetrating network contg., ionic cond. of)

=> d 1117 ibib abs hitstr hitind 1-36

L117 ANSWER 1 OF 36 HCPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2006:657261 HCPLUS

DOCUMENT NUMBER: 145:127575

TITLE: Long life lithium batteries with  
 stabilized electrodes  
 INVENTOR(S): Amine, Khalil; Liu, Jun; Vissers, Donald R.; Lu,  
 Wenquan  
 PATENT ASSIGNEE(S): The University of Chicago, USA  
 SOURCE: U.S. Pat. Appl. Publ., 21 pp., Cont.-in-part of  
 U.S. Ser. No. 857,365.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 2  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2006147809	A1	20060706	US 2006-338902	200601 24
US 2005019670	A1	20050127	US 2004-857365	200405 28
<--				
PRIORITY APPLN. INFO.:			US 2004-857365	A2 200405 28
			US 2005-647361P	P 200501 26
			US 2003-488063P	P 200307 17

&lt;--

AB The present invention relates to non-aq. **electrolytes** having electrode stabilizing additives, stabilized electrodes, and electrochem. devices contg. the same. Thus the present invention provides **electrolytes** contg. an alkali metal salt, a polar aprotic solvent, and an electrode stabilizing additive. In certain **electrolytes**, the alkali metal salt is a bis(chelato)borate and the additives include substituted or unsubstituted linear, branched or cyclic hydrocarbons comprising at least one oxygen atom and at least one aryl, alkenyl or alkynyl group. In other **electrolytes**, the additives include a substituted aryl compd. or a substituted or unsubstituted heteroaryl compd. wherein the additive comprises at least one oxygen atom. There are also provided methods of making the **electrolytes** and **batteries** employing the **electrolytes**. The invention also provides for electrode materials. Cathodes of the present invention may be further stabilized by surface coating the particles of the spinel or olivine with a material that can neutralize acid or otherwise lessen or prevent leaching of the manganese or iron ions. In some embodiments the coating is polymeric and in other embodiments the coating is a metal oxide such as ZrO<sub>2</sub>, TiO<sub>2</sub>, ZnO, WO<sub>3</sub>, Al<sub>2</sub>O<sub>3</sub>, MgO, SiO<sub>2</sub>, SnO<sub>2</sub> AlPO<sub>4</sub>, Al(OH)<sub>3</sub>, a mixt. of any two or more thereof.

IT 7439-93-2D, Lithium, alkyl fliorophosphate 7791-03-9  
 , Lithium perchlorate 15365-14-7, Iron lithium phosphate  
 felipo4 33454-82-9, Lithium triflate 90076-65-6

132843-44-8

RL: DEV (Device component use); USES (Uses)  
 (long life lithium **batteries** with stabilized  
 electrodes)

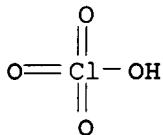
RN 7439-93-2 HCPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

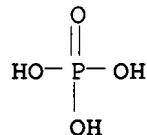
RN 7791-03-9 HCPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 15365-14-7 HCPLUS

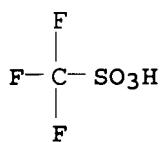
CN Phosphoric acid, iron(2+) lithium salt (1:1:1) (9CI) (CA INDEX  
 NAME)

● Fe(II)

● Li

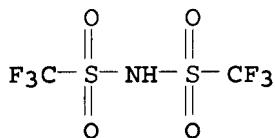
RN 33454-82-9 HCPLUS

CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX  
 NAME)



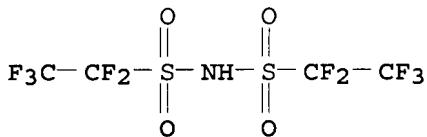
## ● Li

RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



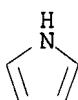
## ● Li

RN 132843-44-8 HCAPLUS  
 CN Ethanesulfonamide, 1,1,2,2,2-pentafluoro-N-[(pentafluoroethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



## ● Li

IT 109-97-7D, Pyrrole, aryloxy derivs. 110-00-9D,  
 Furan, aryloxy derivs. 897381-31-6 897381-39-4  
 897381-44-1  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (long life lithium batteries with stabilized  
 electrodes)  
 RN 109-97-7 HCAPLUS  
 CN 1H-Pyrrole (9CI) (CA INDEX NAME)



RN 110-00-9 HCAPLUS  
 CN Furan (7CI, 8CI, 9CI) (CA INDEX NAME)

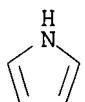


RN 897381-31-6 HCAPLUS  
 CN Furan, diethenyl- (9CI) (CA INDEX NAME)



2 [ D1-CH=CH<sub>2</sub> ]

RN 897381-39-4 HCAPLUS  
 CN 1H-Pyrrole, diethenylmethoxy- (9CI) (CA INDEX NAME)



D1-O-Me

2 [ D1-CH=CH<sub>2</sub> ]

RN 897381-44-1 HCAPLUS  
 CN Furan, diethenylmethoxy- (9CI) (CA INDEX NAME)



D1-O-Me

2 [ D1-CH=CH<sub>2</sub> ]

INCL 429326000; 429330000

MEI HUANG EIC1700 REM4B28 571-272-3952

08/31/2006

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium **battery** stabilized electrode  
 IT Hydrocarbons, uses  
   RL: MOA (Modifier or additive use); USES (Uses)  
     (cyclic; long life lithium **batteries** with stabilized  
       electrodes)  
 IT Cyclic compounds  
   RL: MOA (Modifier or additive use); USES (Uses)  
     (hydrocarbons; long life lithium **batteries** with  
       stabilized electrodes)  
 IT Secondary **batteries**  
   (lithium; long life lithium **batteries** with stabilized  
     electrodes)  
 IT **Battery** electrodes  
   (long life lithium **batteries** with stabilized  
     electrodes)  
 IT Coating materials  
   (surface; long life lithium **batteries** with stabilized  
     electrodes)  
 IT 60-29-7, Diethyl ether, uses 79-20-9, Methyl acetate 96-48-0,  
 γ-Butyrolactone 96-49-1, Ethylene carbonate 105-58-8,  
 Diethyl carbonate 108-32-7, Propylene carbonate 109-60-4, Propyl  
 acetate 126-33-0, Sulfolane 141-78-6, Ethyl acetate, uses  
 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate  
 7439-93-2D, Lithium, alkyl fliorophosphate 7791-03-9  
 , Lithium perchlorate 12031-95-7, Lithium titanium oxide  
 (Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub>) 14283-07-9, Lithium tetrafluoroborate  
 15365-14-7, Iron lithium phosphate felipo4 21324-40-3,  
 Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate  
 33454-82-9, Lithium triflate 61179-01-9, Aluminum lithium  
 manganese oxide 90076-65-6 132404-42-3  
 132843-44-8 244761-29-3, Lithium bisoxalatoborate  
 346417-97-8, Cobalt lithium manganese nickel oxide  
 (Co<sub>0.33</sub>LiMn<sub>0.33</sub>Ni<sub>0.33</sub>O<sub>2</sub>) 409071-16-5 678966-16-0  
 RL: DEV (Device component use); USES (Uses)  
   (long life lithium **batteries** with stabilized  
     electrodes)  
 IT 84-15-1D, o-Terphenyl, aryloxy derivs. 86-74-8D, Carbazole,  
 aryloxy derivs. 88-12-0, 1-Vinylpyrrolidin-2-one, uses 91-22-5D,  
 Quinoline, aryloxy derivs. 101-84-8, Diphenyl ether 101-84-8D,  
 Diphenyl ether, aryloxy derivs. 102-09-0, Diphenyl carbonate  
 102-09-0D, Phenyl carbonate, aryloxy derivs. 106-92-3, Allyl  
 glycidyl ether 109-93-3, Divinyl ether 109-97-7D,  
 Pyrrole, aryloxy derivs. 109-99-9D, Tetrahydrofuran, aryloxy  
 derivs. 110-00-9D, Furan, aryloxy derivs. 110-89-4D,  
 Piperidine, aryloxy derivs. 111-34-2, Butyl vinyl ether  
 120-92-3D, Cyclopentanone, aryloxy derivs. 140-67-0,  
 4-Allylanisole 142-96-1D, Butyl ether, aryloxy derivs.  
 176-53-4D, Ethylene silicate, aryloxy derivs. 288-32-4D,  
 Imidazole, aryloxy derivs. 289-80-5D, Pyridazine, aryloxy derivs.  
 290-37-9D, Pyrazine, aryloxy derivs. 291-37-2D,  
 Cyclotriphosphazene, Vinyl contg. derivs. 291-37-2D,  
 Cyclotriphosphazene, aryloxy derivs. 503-30-0D, Oxetane, aryloxy  
 derivs. 614-99-3D, Ethyl-2-furoate, aryloxy derivs. 930-22-3  
 1072-53-3D, Ethylene sulfate, aryloxy derivs. 1917-10-8,  
 Vinyl-2-furoate 3724-65-0D, Crotonic acid, aryloxy derivs.  
 3741-38-6D, Ethylene sulfite, aryloxy derivs. 4245-37-8, Vinyl  
 methacrylate 4370-23-4, 1-Vinylpiperidin-2-one 4427-96-7, Vinyl  
 ethylene carbonate 5009-27-8D, Cyclopropanone, aryloxy derivs.  
 6622-92-0, 2,4-Dimethyl-6-hydroxy-pyrimidine 7570-02-7, DiVinyl

carbonate 12789-45-6, Methyl phosphate 14265-44-2D, Phosphate, aryloxy derivs. 14861-06-4, Vinyl crotonate 15896-04-5  
 16053-89-7D, 2-Furancarboxylate, aryloxy derivs. 16410-02-9  
 18358-13-9D, Methacrylate, aryloxy derivs. 21994-23-0  
 23462-75-1, Dihydropyran-3-one 32893-16-6 33879-62-8,  
 2-Vinyloxetane 36885-49-1, Vinyl phosphate 37203-76-2, Ethyl phosphate 37275-48-2D, Bipyridine, methoxy vinyl derivs.  
 44414-27-9 50337-14-9, 3-Vinylcyclopentanone 53627-36-4,  
 $\beta$ -Vinyl- $\gamma$ -butyrolactone 57453-76-6 61548-40-1  
 66166-61-8, 3-Vinylcyclobutanone 66281-16-1 66956-76-1  
 72607-84-2 104531-81-9 117823-03-7 121712-01-4 139669-84-4  
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 897028-09-0 897028-10-3 897028-11-4 897028-12-5 897028-13-6  
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**897381-39-4** 897381-40-7 897381-41-8 897381-42-9  
 897381-43-0 **897381-44-1** 897381-45-2 897381-46-3  
 897381-47-4

RL: MOA (Modifier or additive use); USES (Uses)  
 (long life lithium batteries with stabilized  
 electrodes)

IT 1309-48-4, Magnesium oxide (MgO), uses 1314-13-2, Zinc oxide (ZnO), uses 1314-23-4, Zirconia, uses 1314-35-8, Tungsten trioxide, uses 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 7784-30-7, Aluminum phosphate alpo4 13463-67-7, Titania, uses 18282-10-5, Tin dioxide 21645-51-2, Aluminum hydroxide, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (long life lithium batteries with stabilized  
 electrodes)

L117 ANSWER 2 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2005:431288 HCAPLUS  
 DOCUMENT NUMBER: 142:484779  
 TITLE: **Battery having electrolyte**  
 including one or more additives  
 INVENTOR(S): Yoon, Sang Young; Nakahara, Hiroshi; Amine, Khalil  
 PATENT ASSIGNEE(S): USA  
 SOURCE: U.S. Pat. Appl. Publ., 31 pp., Cont.-in-part of  
 U.S. Ser. No. 496,231,  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 11  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 2005106470	A1	20050519	US 2004-962125	200410 07
WO 2003083970	A1	20031009	WO 2003-US2127	200301 22

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 EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI,  
 SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE,  
 SN, TD, TG

WO 2003083971 A1 20031009 WO 2003-US2128

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 SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE,  
 SN, TD, TG

WO 2003083974 A1 20031009 WO 2003-US8783

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 LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,  
 NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL,  
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 ZW  
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 EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE,  
 SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,  
 NE, SN, TD, TG

US 2004248014 A1 20041209 US 2004-810081

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US 2005019656 A1 20050127 US 2004-496231

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US 2005170253 A1 20050804 US 2004-971912

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PRIORITY APPLN. INFO.:

WO 2003-US2127

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US 2002-104352	A	200203
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US 2003-502017P	P	200309
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US 2004-606340P	P	200409
		01

AB A battery includes an electrolyte activating one or more anodes and one or more cathodes. The electrolyte includes one or more salts and one or more additives in a solvent. The solvent includes a silane or a siloxane. The one or more additives form a passivation layer on at least one of the anodes. In some instances, the additives include vinyl carbonate and/or vinyl ethylene carbonate.

IT 556-65-0, Lithium thiocyanate 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 33454-82-9, Lithium triflate 90076-65-6 115028-88-1

132843-44-8 345891-32-9

RL: DEV (Device component use); USES (Uses)  
(battery having electrolyte including one or more additives)

RN 556-65-0 HCPLUS

CN Thiocyanic acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

HS—C≡N

● Li

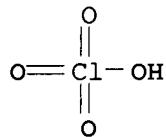
RN 7439-93-2 HCPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

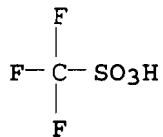
RN 7791-03-9 HCPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



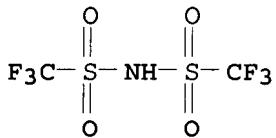
## ● Li

RN 33454-82-9 HCAPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



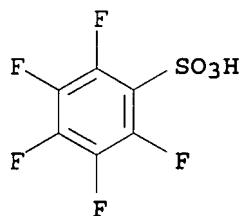
## ● Li

RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



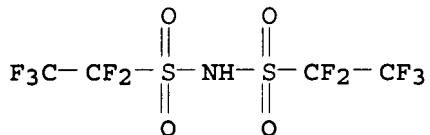
## ● Li

RN 115028-88-1 HCAPLUS  
 CN Benzenesulfonic acid, pentafluoro-, lithium salt (9CI) (CA INDEX NAME)



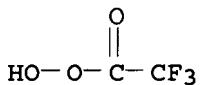
● Li

RN 132843-44-8 HCAPLUS  
 CN Ethanesulfonamide, 1,1,2,2,2-pentafluoro-N-[(pentafluoroethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



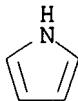
● Li

RN 345891-32-9 HCAPLUS  
 CN Ethaneperoxyic acid, trifluoro-, lithium salt (9CI) (CA INDEX NAME)



● Li

IT 29992-75-4  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (battery having electrolyte including one or  
 more additives)  
 RN 29992-75-4 HCAPLUS  
 CN 1H-Pyrrole, ethenyl- (9CI) (CA INDEX NAME)



D1- CH= CH<sub>2</sub>

IC ICM H01M010-40  
 ICS H01M002-16  
 INCL 429324000; 429137000; 429328000; 429330000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38  
 ST **battery electrolyte additive**  
 IT Passivation  
     (anode; **battery** having **electrolyte** including  
     one or more additives)  
 IT **Battery electrolytes**  
     Primary **batteries**  
     Secondary **batteries**  
     (**battery** having **electrolyte** including one or  
     more additives)  
 IT Carbon fibers, uses  
     Carbonaceous materials (technological products)  
     RL: DEV (Device component use); USES (Uses)  
     (**battery** having **electrolyte** including one or  
     more additives)  
 IT Polyoxyalkylenes, uses  
     RL: MOA (Modifier or additive use); USES (Uses)  
     (**battery** having **electrolyte** including one or  
     more additives)  
 IT Polysiloxanes, uses  
     RL: MOA (Modifier or additive use); USES (Uses)  
     (**battery** having **electrolyte** including one or  
     more additives)  
 IT 556-65-0, Lithium thiocyanate 917-54-4, Lithium methide  
 7439-93-2, Lithium, uses 7791-03-9, Lithium  
 perchlorate 9002-88-4, Polyethylene 12135-01-2, Lithium imide  
 14024-11-4, Lithium tetrachloroaluminate 14283-07-9, Lithium  
 tetrafluoroborate 14485-20-2, Lithium tetraphenylborate  
 15955-98-3, Lithium tetrachlorogallate 18424-17-4, Lithium  
 hexafluoroantimonate 21324-40-3, Lithium hexafluorophosphate  
 27208-14-6, Tetrasiloxane 29935-35-1, Lithium hexafluoroarsenate  
 33454-82-9, Lithium triflate 90076-65-6  
 115028-88-1 132404-42-3 132843-44-8  
 193214-24-3, Aluminum cobalt lithium nickel oxide  
 (Al<sub>0.05</sub>Co<sub>0.15</sub>LiNi<sub>0.80</sub>) 195144-63-9, Lithium oxide (Li<sub>2</sub>O)  
 244761-29-3, Lithium bisoxalatoborate 345891-32-9  
     RL: DEV (Device component use); USES (Uses)  
     (**battery** having **electrolyte** including one or  
     more additives)  
 IT 463-79-6D, Carbonic acid, arom. ester 463-79-6D, Carbonic acid,  
 cyclic ester 463-79-6D, Carbonic acid, vinyl ester 513-81-5  
 1337-81-1, Vinyl pyridine 1469-73-4, Propylene sulfite  
 3741-38-6, Ethylene sulfite 4427-92-3, Phenyl ethylene carbonate  
 4427-96-7, Vinyl ethylene carbonate 7570-02-7 7803-62-5, Silane,  
 uses 13940-57-3, Trisiloxane 16761-08-3 27306-78-1

29992-75-4 30676-86-9 71437-41-7 851904-00-2  
 851904-03-5  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (battery having electrolyte including one or  
 more additives)  
 IT 7440-44-0, Carbon, uses  
 RL: DEV (Device component use); USES (Uses)  
 (beads; battery having electrolyte including  
 one or more additives)  
 IT 7782-42-5, Graphite, uses  
 RL: DEV (Device component use); USES (Uses)  
 (flakes; battery having electrolyte including  
 one or more additives)  
 IT 7664-38-2D, Phosphoric acid, fluorinated, alkyl ester  
 RL: DEV (Device component use); USES (Uses)  
 (fluoro, lithium, alkyl; battery having  
 electrolyte including one or more additives)

L117 ANSWER 3 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2005:283756 HCAPLUS  
 DOCUMENT NUMBER: 142:358036  
 TITLE: Nonaqueous lithium secondary battery  
 with improved cyclability and/or high  
 temperature safety  
 INVENTOR(S): Ryu, Duk-Hyun; Lee, Jae-Hyun; Jeong, Jun-Yong;  
 Yeon, Jin-Hee; Jang, Min-Chul; Koo, Chang-Wan;  
 Shin, Sun-Wik; Ku, Cha-Hun; Lee, Han-Ho  
 PATENT ASSIGNEE(S): Lg Chem, Ltd., S. Korea  
 SOURCE: PCT Int. Appl., 20 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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WO 2005029632	A1	20050331	WO 2004-KR2399	200409 20
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US 2005100786	A1	20050512	US 2004-944572	200409 17
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CA 2538605	AA	20050331	CA 2004-2538605	200409

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EP 1671393 A1 20060621 EP 2004-774658

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R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,  
PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK

PRIORITY APPLN. INFO.: KR 2003-65169 A

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WO 2004-KR2399 W

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AB The present invention provides: (i) a nonaq. **electrolyte** for **batteries**, which is characterized by contg. halogen;  
 (ii) a nonaq. **electrolyte** for **batteries**, which is characterized by contg. pyrrol or its deriv. and halogen; and  
 (iii) a lithium secondary **battery** which is characterized by including the nonaq. **electrolyte** (i) or (ii). The inventive lithium secondary **battery** has improvements in charge/discharge and cycle life characteristics at ambient and high temps., and/or storage characteristics and safety at high temp.

IT 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 33454-82-9, Lithium triflate 90076-65-6

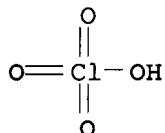
RL: DEV (Device component use); USES (Uses)  
 (nonaq. lithium secondary **battery** with improved cyclability and/or high temp. safety)

RN 7439-93-2 HCPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

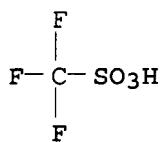
Li

RN 7791-03-9 HCPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



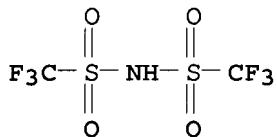
● Li

RN 33454-82-9 HCPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



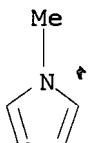
## ● Li

RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)

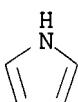


## ● Li

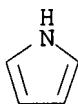
IT 96-54-8, n-Methylpyrrole 109-97-7, Pyrrole  
 109-97-7D, Pyrrole, deriv. 625-84-3,  
 2,5-Dimethylpyrrole 932-16-1, 2-Acetyl n-methylpyrrole  
 1072-83-9, 2-Acetylpyrrole  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. lithium secondary **battery** with improved  
 cyclability and/or high temp. safety)  
 RN 96-54-8 HCAPLUS  
 CN 1H-Pyrrole, 1-methyl- (9CI) (CA INDEX NAME)



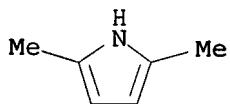
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 CN 1H-Pyrrole (9CI) (CA INDEX NAME)



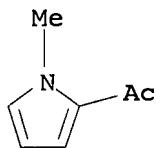
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 CN 1H-Pyrrole (9CI) (CA INDEX NAME)



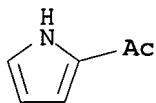
RN 625-84-3 HCAPLUS  
 CN 1H-Pyrrole, 2,5-dimethyl- (9CI) (CA INDEX NAME)



RN 932-16-1 HCAPLUS  
 CN Ethanone, 1-(1-methyl-1H-pyrrol-2-yl)- (9CI) (CA INDEX NAME)



RN 1072-83-9 HCAPLUS  
 CN Ethanone, 1-(1H-pyrrol-2-yl)- (9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST nonaq lithium secondary **battery** improved cyclability;  
 safety improvement nonaq lithium secondary **battery**  
 IT Transition metal oxides  
 RL: DEV (Device component use); USES (Uses)  
 (lithium-contg.; nonaq. lithium secondary **battery** with  
 improved cyclability and/or high temp. safety)  
 IT Secondary batteries  
 (lithium; nonaq. lithium secondary **battery** with  
 improved cyclability and/or high temp. safety)  
 IT **Battery electrolytes**  
 Safety  
 (nonaq. lithium secondary **battery** with improved  
 cyclability and/or high temp. safety)  
 IT Alloys, uses  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. lithium secondary **battery** with improved  
 cyclability and/or high temp. safety)  
 IT Halogens  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. lithium secondary **battery** with improved  
 cyclability and/or high temp. safety)

IT 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate  
 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate  
 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate  
 7439-93-2, Lithium, uses 7440-44-0, Carbon, uses  
 7791-03-9, Lithium perchlorate 12031-65-1, Lithium nickel  
 oxide (LiNiO<sub>2</sub>) 12057-17-9, Lithium manganese oxide (LiMn<sub>2</sub>O<sub>4</sub>)  
 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>) 14283-07-9, Lithium  
 tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate  
 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium  
 triflate 56525-42-9, Methyl propyl carbonate 90076-65-6  
 135573-53-4, Cobalt lithium nickel oxide Co<sub>0.1</sub>LiNi<sub>0.1</sub>O<sub>2</sub>  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. lithium secondary **battery** with improved  
 cyclability and/or high temp. safety)  
 IT 96-54-8, n-Methylpyrrole 109-97-7, Pyrrole  
 109-97-7D, Pyrrole, deriv. 625-82-1, 2,4-Dimethylpyrrole  
 625-84-3, 2,5-Dimethylpyrrole 932-16-1, 2-Acetyl  
 n-methylpyrrole 1072-83-9, 2-Acetylpyrrole 7553-56-2,  
 Iodine, uses 7726-95-6, Bromine, uses 7782-50-5, Chlorine, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. lithium secondary **battery** with improved  
 cyclability and/or high temp. safety)

REFERENCE COUNT: 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR  
 THIS RECORD. ALL CITATIONS AVAILABLE IN  
 THE RE FORMAT

L117 ANSWER 4 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2005:78059 HCAPLUS  
 DOCUMENT NUMBER: 142:159580  
 TITLE: Long life lithium **batteries** with  
 stabilized electrodes  
 INVENTOR(S): Amine, Khalil; Kim, Jaekook; Vissers, Donald R.  
 PATENT ASSIGNEE(S): USA  
 SOURCE: U.S. Pat. Appl. Publ., 13 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 2  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 2005019670	A1	20050127	US 2004-857365	200405 28
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US 2006147809	A1	20060706	US 2006-338902	200601 24
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PRIORITY APPLN. INFO.:			US 2003-488063P	P 200307 17
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-----			US 2004-857365	A2 200405 28
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-----			US 2005-647361P	P 200501

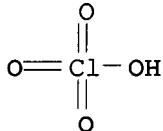
AB The present invention relates to nonaq. **electrolytes** having stabilization additives and electrochem. devices contg. the same. Thus the present invention provides **electrolytes** contg. an alkali metal salt, a polar aprotic solvent, a first additive that is a substituted or unsubstituted organoamine, substituted or unsubstituted alkane, substituted or unsubstituted alkene, or substituted or unsubstituted aryl compd., and/or a second additive that is a metal(chelato)borate. When used in electrochem. devices with, e.g., lithium manganese oxide spinel electrodes, the new **electrolytes** provide **batteries** with improved calendar and cycle life.

IT 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 15365-14-7, Iron lithium phosphate felipo4 33454-82-9, Lithium triflate 90076-65-6 132843-44-8  
RL: DEV (Device component use); USES (Uses)  
(long life lithium **batteries** with stabilized electrodes)

RN 7439-93-2 HCAPLUS  
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

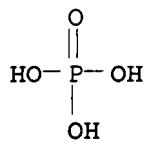
Li

RN 7791-03-9 HCAPLUS  
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

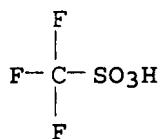
RN 15365-14-7 HCAPLUS  
CN Phosphoric acid, iron(2+) lithium salt (1:1:1) (9CI) (CA INDEX NAME)



● Fe(II)

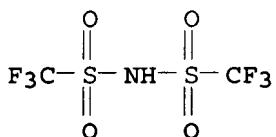
● Li

RN 33454-82-9 HCAPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX  
 NAME)



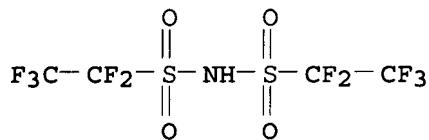
● Li

RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
 lithium salt (9CI) (CA INDEX NAME)



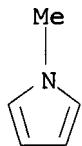
● Li

RN 132843-44-8 HCAPLUS  
 CN Ethanesulfonamide, 1,1,2,2,2-pentafluoro-N-  
 [(pentafluoroethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

IT 96-54-8, n-Methylpyrrole  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (long life lithium batteries with stabilized  
 electrodes)  
 RN 96-54-8 HCAPLUS  
 CN 1H-Pyrrole, 1-methyl- (9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 ICS H01M004-58; H01M004-52; H01M004-60; H01M004-50  
 INCL 429326000; 429213000; 429224000; 429231100; 429223000; 429231300;  
 429221000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium battery stabilized electrode  
 IT Secondary batteries  
 (lithium; long life lithium batteries with stabilized  
 electrodes)  
 IT Battery electrodes  
 Battery electrolytes  
 (long life lithium batteries with stabilized  
 electrodes)  
 IT Intermetallic compounds  
 RL: DEV (Device component use); USES (Uses)  
 (long life lithium batteries with stabilized  
 electrodes)  
 IT Alkanes, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (long life lithium batteries with stabilized  
 electrodes)  
 IT Alkenes, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (long life lithium batteries with stabilized  
 electrodes)  
 IT Aromatic compounds  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (long life lithium batteries with stabilized  
 electrodes)  
 IT Chelates  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (long life lithium batteries with stabilized  
 electrodes)

IT Amines, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (org.; long life lithium batteries with stabilized electrodes)

IT Tin alloy, base  
 RL: DEV (Device component use); USES (Uses)  
 (long life lithium batteries with stabilized electrodes)

IT 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate  
 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate  
 115-10-6, Dimethyl ether 616-38-6, Dimethyl carbonate 623-53-0,  
 Ethyl methyl carbonate 7439-93-2, Lithium, uses  
 7440-44-0, Carbon, uses 7664-38-2D, Phosphoric acid, alkyl fluoro compd., lithium salt 7782-42-5, Graphite, uses  
 7791-03-9, Lithium perchlorate 11099-11-9, Vanadium oxide  
 12022-46-7, Iron lithium oxide (FeLiO<sub>2</sub>) 12031-65-1, Lithium nickel oxide (LiNiO<sub>2</sub>) 12031-95-7, Lithium titanium oxide (Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub>)  
 12057-17-9, Lithium manganese oxide (LiMn<sub>2</sub>O<sub>4</sub>) 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>) 14283-07-9, Lithium tetrafluoroborate  
 15365-14-7, Iron lithium phosphate felipo<sub>4</sub> 21324-40-3,  
 Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate 90076-65-6  
 128975-24-6, Lithium manganese nickel oxide limn0.5ni0.5o<sub>2</sub>  
 132404-42-3 132843-44-8 609349-41-9, Cobalt lithium manganese nickel oxide (Co0.3LiMn0.3Ni0.3O<sub>2</sub>)  
 RL: DEV (Device component use); USES (Uses)  
 (long life lithium batteries with stabilized electrodes)

IT 84-15-1, o-Terphenyl 91-19-0, Quinoxaline 91-20-3, Naphthalene, uses 91-22-5, Quinoline, uses 92-52-4, Biphenyl, uses  
 96-54-8, n-Methylpyrrole 100-43-6, 4-Vinylpyridine  
 100-69-6, 2-Vinylpyridine 101-84-8, Diphenyl ether 102-71-6,  
 Triethanolamine, uses 103-29-7, 1,2-Diphenylethane 106-99-0,  
 Butadiene, uses 110-86-1, Pyridine, uses 110-89-4, Piperidine, uses 119-65-3, Isoquinoline 120-72-9, Indole, uses 288-32-4,  
 Imidazole, uses 289-80-5, Pyridazine 289-95-2, Pyrimidine 290-37-9, Pyrazine 1118-58-7, 1,3-Dimethyl 1,3-butadiene  
 1337-81-1, Vinyl Pyridine 4177-16-6, Pyrazine, vinyl- 4427-96-7,  
 Vinyl ethylene carbonate 7570-02-7, Divinyl carbonate 29383-23-1, Vinyl Imidazole 30676-86-9, Piperidine, vinyl-  
 30851-79-7 31094-36-7 51222-11-8 66281-01-4 66281-16-1  
 77208-21-0 244761-29-3, Lithium bis(oxalato)borate 409071-16-5  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (long life lithium batteries with stabilized electrodes)

L117 ANSWER 5 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2004:633118 HCAPLUS  
 DOCUMENT NUMBER: 141:126408  
 TITLE: Lithium based electrochemical cell systems with suppression of gas evolution  
 INVENTOR(S): Hyung, Yoo-Eup; Vissers, Donald R.; Amine, Khalil  
 PATENT ASSIGNEE(S): The University of Chicago, USA  
 SOURCE: U.S. Pat. Appl. Publ., 7 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1

## PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 2004151951	A1	20040805	US 2003-738400	200312 17
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PRIORITY APPLN. INFO.:			US 2002-434214P	P 200212 17
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OTHER SOURCE(S): MARPAT 141:126408

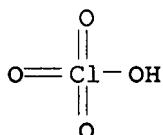
AB Primary and secondary Li-ion and lithium-metal based electrochem. cell systems are disclosed. Suppression of gas generation is achieved in the cell through the addn. of an additive or additives to the electrolyte system of the resp. cell, or to the cell whether it be a liq., a solid- or plasticized polymer electrolyte system. The gas suppression additives are preferably based on unsatd. hydrocarbons.

IT 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 12676-27-6D, derivs. 15365-14-7, Iron lithium phosphate felipo4 33454-82-9, Lithium triflate 90076-65-6 132843-44-8 304646-82-0D, Phosphorofluoridic acid, monolithium salt, alkyl deriv.  
RL: DEV (Device component use); USES (Uses)  
(lithium based electrochem. cell systems with suppression of gas evolution)

RN 7439-93-2 HCPLUS  
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

## Li

RN 7791-03-9 HCPLUS  
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

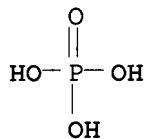


## ● Li

RN 12676-27-6 HCPLUS  
CN Boric acid, lithium salt (9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

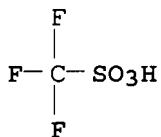
RN 15365-14-7 HCPLUS  
CN Phosphoric acid, iron(2+) lithium salt (1:1:1) (9CI) (CA INDEX NAME)



● Fe(II)

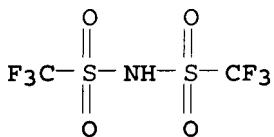
● Li

RN 33454-82-9 HCAPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX  
 NAME)



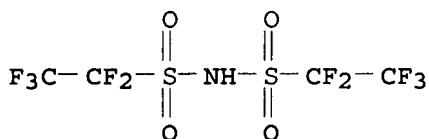
● Li

RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
 lithium salt (9CI) (CA INDEX NAME)



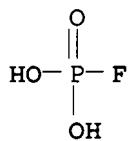
● Li

RN 132843-44-8 HCAPLUS  
 CN Ethanesulfonamide, 1,1,2,2,2-pentafluoro-N-  
 [(pentafluoroethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

RN 304646-82-0 HCAPLUS  
 CN Phosphorofluoridic acid, monolithium salt (9CI) (CA INDEX NAME)

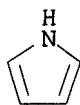


● Li

IT 109-97-7, Pyrrole 29992-75-4, 1H-Pyrrole, ethenyl-  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (lithium based electrochem. cell systems with  
 suppression of gas evolution)  
 RN 109-97-7 HCAPLUS  
 CN 1H-Pyrrole (9CI) (CA INDEX NAME)



RN 29992-75-4 HCAPLUS  
 CN 1H-Pyrrole, ethenyl- (9CI) (CA INDEX NAME)



D1-CH=CH<sub>2</sub>

IC ICM H01M016-00  
 ICS H01M004-50; H01M004-58; H01M004-52; H01M010-40; H01M010-34;  
 H01M010-52; H01M004-48  
 INCL 429009000; 429231400; 429231950; 429149000; 429326000; 429331000;  
 429332000; 429231100; 429231300; 429224000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium battery gas generation suppression  
 IT Primary batteries  
 Secondary batteries  
 (lithium; lithium based electrochem. cell  
 systems with suppression of gas evolution)  
 IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate  
 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate  
 623-53-0, Ethyl methyl carbonate 7439-93-2, Lithium, uses  
 7440-44-0, Carbon, uses 7791-03-9, Lithium perchlorate  
 11099-11-9, Vanadium oxide 12022-46-7, Iron lithium oxide felio2  
 12031-65-1, Lithium nickel oxide linio2 12031-72-0, Lithium  
 magnesium manganese oxide limg0.5mn1.5o4 12057-17-9, Lithium  
 manganese oxide limn2o4 12190-79-3, Cobalt lithium oxide colio2  
 12676-27-6D, derivs. 14283-07-9, Lithium tetrafluoroborate  
 15365-14-7, Iron lithium phosphate felipo4 21324-40-3,  
 Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate  
 33454-82-9, Lithium triflate 90076-65-6  
 128975-24-6, Lithium manganese nickel oxide limn0.5ni0.5o2  
 132404-42-3 132843-44-8 177997-11-4, Cobalt gallium  
 lithium nickel oxide 177997-12-5, Boron Cobalt lithium nickel  
 oxide 177997-13-6, Aluminum cobalt lithium nickel oxide  
 244304-18-5, Cobalt lithium nickel silicon oxide 244304-20-9,  
 Cobalt lithium nickel titanium oxide 304646-82-0D,  
 Phosphorofluoridic acid, monolithium salt, alkyl deriv.  
 609349-41-9, Cobalt Lithium manganese nickel oxide  
 Co0.3limn0.3ni0.3o2  
 RL: DEV (Device component use); USES (Uses)  
 (lithium based electrochem. cell  
 systems with suppression of gas evolution)  
 IT 100-42-5, Styrene, uses 106-99-0, 1,3-Butadiene, uses  
 109-97-7, Pyrrole 110-85-0, Piperazine, uses 115-86-6,  
 Triphenylphosphate 463-79-6D, Carbonic acid, arom. ester  
 513-81-5, 2,3-Dimethyl-1,3-butadiene 592-42-7, 1,5-Hexadiene  
 758-86-1, 2,3-Dimethyl-1,4-pentadiene 1337-81-1, Vinylpyridine  
 4427-96-7, Vinyl ethylene carbonate 16761-08-3 29992-75-4  
 , 1H-Pyrrole, ethenyl- 71437-41-7, Piperazine, ethenyl-  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (lithium based electrochem. cell systems with  
 suppression of gas evolution)

L117 ANSWER 6 OF 36 HCPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2004:219899 HCPLUS  
 DOCUMENT NUMBER: 140:238519  
 TITLE: Overcharge protection of nonaqueous rechargeable  
 lithium batteries by cyano-substituted  
 thiophenes as electrolyte additives  
 INVENTOR(S): Otterstedt, Ralph; Kirchmeyer, Stephan; Brassat,  
 Lutz  
 PATENT ASSIGNEE(S): Germany  
 SOURCE: U.S. Pat. Appl. Publ., 10 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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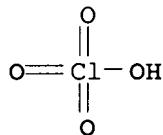
US 2004053138	A1	20040318	US 2003-660846	200309 12
DE 10340500	A1	20040325	DE 2003-10340500	200309 03
JP 2004111393	A2	20040408	JP 2003-323107	200309 16
CN 1490892	A	20040421	CN 2003-158890	200309 16
PRIORITY APPLN. INFO.:				DE 2002-10244589 A 200209 16
<--				

OTHER SOURCE(S) : MARPAT 140:238519

AB The invention relates to the use of cyano-substituted thiophenes as electrolyte additives for protecting nonaq., rechargeable lithium batteries from overcharging, and lithium batteries comprising these additives. The electrolyte contains the thiophene additive at 2-5 vol.%.  
 IT 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate  
 RL: DEV (Device component use); USES (Uses)  
 (overcharge protection of nonaq. rechargeable lithium batteries by cyano-substituted thiophenes as electrolyte additives)  
 RN 7439-93-2 HCPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7791-03-9 HCPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 110-02-1D, Thiophene, cyano-substituted  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (overcharge protection of nonaq. rechargeable lithium batteries by cyano-substituted thiophenes as electrolyte additives)  
 RN 110-02-1 HCPLUS

CN Thiophene (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 ICS H01M004-52; H01M004-58; H01M004-40  
 INCL 429307000; 429327000; 429231400; 429231800; 429231950; 429223000;  
 429231100  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium **battery** overcharge protection cyano substituted  
 thiophene **electrolyte** additive  
 IT Sulfonic acids, uses  
 RL: DEV (Device component use); USES (Uses)  
 (alkanesulfonic, perfluorinated. **lithium salts**  
 ; overcharge protection of nonaq. rechargeable lithium  
 batteries by cyano-substituted thiophenes as  
**electrolyte** additives)  
 IT Sulfonic acids, uses  
 RL: DEV (Device component use); USES (Uses)  
 (arenesulfonic, perfluorinated. **lithium salts**  
 ; overcharge protection of nonaq. rechargeable lithium  
 batteries by cyano-substituted thiophenes as  
**electrolyte** additives)  
 IT Imides  
 RL: DEV (Device component use); USES (Uses)  
 (bisfluoroalkylsulfonyl, **lithium salt**;  
 overcharge protection of nonaq. rechargeable lithium  
 batteries by cyano-substituted thiophenes as  
**electrolyte** additives)  
 IT Perfluoro compounds  
 RL: DEV (Device component use); USES (Uses)  
 (carboxylic acids, **lithium salts**; overcharge  
 protection of nonaq. rechargeable lithium **batteries** by  
 cyano-substituted thiophenes as **electrolyte** additives)  
 IT Carboxylic acids, uses  
 RL: DEV (Device component use); USES (Uses)  
 (esters; overcharge protection of nonaq. rechargeable lithium  
 batteries by cyano-substituted thiophenes as  
**electrolyte** additives)  
 IT Secondary **batteries**  
 (lithium; overcharge protection of nonaq. rechargeable lithium  
 batteries by cyano-substituted thiophenes as  
**electrolyte** additives)  
 IT Polymers, uses  
 RL: DEV (Device component use); USES (Uses)  
 (membrane; overcharge protection of nonaq. rechargeable lithium  
 batteries by cyano-substituted thiophenes as  
**electrolyte** additives)  
 IT Carboxylic acids, uses  
 RL: DEV (Device component use); USES (Uses)  
 (nitriles; overcharge protection of nonaq. rechargeable lithium  
 batteries by cyano-substituted thiophenes as  
**electrolyte** additives)  
 IT **Battery electrolytes**  
 Secondary **battery** separators  
 (overcharge protection of nonaq. rechargeable lithium

**batteries by cyano-substituted thiophenes as electrolyte additives)**

IT Alkanes, uses  
 Carbonaceous materials (technological products)  
 Ethers, uses  
 Lactones  
 Oxides (inorganic), uses  
 Transition metal chalcogenides  
 Transition metal oxides  
 RL: DEV (Device component use); USES (Uses)  
 (overcharge protection of nonaq. rechargeable lithium batteries by cyano-substituted thiophenes as electrolyte additives)

IT Alkanes, uses  
 RL: DEV (Device component use); USES (Uses)  
 (perfluorinated; overcharge protection of nonaq. rechargeable lithium batteries by cyano-substituted thiophenes as electrolyte additives)

IT Carboxylic acids, uses  
 RL: DEV (Device component use); USES (Uses)  
 (perfluoro, lithium salts; overcharge protection of nonaq. rechargeable lithium batteries by cyano-substituted thiophenes as electrolyte additives)

IT Glass, uses  
 RL: DEV (Device component use); USES (Uses)  
 (porous; overcharge protection of nonaq. rechargeable lithium batteries by cyano-substituted thiophenes as electrolyte additives)

IT Lithium alloy, base  
 RL: DEV (Device component use); USES (Uses)  
 (overcharge protection of nonaq. rechargeable lithium batteries by cyano-substituted thiophenes as electrolyte additives)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 463-79-6D, Carbonic acid, ester 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 872-36-6, Vinylene carbonate 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 12057-24-8, Lithium oxide, uses 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate 113066-89-0, Cobalt lithium nickeloxide Co0.2LiNi0.8O2 131344-56-4, Cobalt lithium nickel oxide 177997-13-6, Aluminum Cobalt lithium nickel oxide 182442-95-1, Cobalt lithium manganese nickel oxide 244761-29-3, Lithium bisoxalatoborate  
 RL: DEV (Device component use); USES (Uses)  
 (overcharge protection of nonaq. rechargeable lithium batteries by cyano-substituted thiophenes as electrolyte additives)

IT 110-02-1D, Thiophene, cyano-substituted  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (overcharge protection of nonaq. rechargeable lithium batteries by cyano-substituted thiophenes as electrolyte additives)

L117 ANSWER 7 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:163800 HCAPLUS

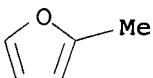
DOCUMENT NUMBER: 136:219519

TITLE: Phenyl boron-based compounds as anion receptors for nonaqueous battery electrolytes

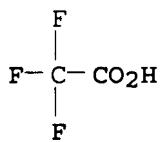
INVENTOR(S) : Lee, Hung Sui; Yang, Xiao-qing; McBreen, James;  
 Sun, Xuehui  
 PATENT ASSIGNEE(S) : Brookhaven Science Associates, Llc, USA  
 SOURCE: U.S., 15 pp., Cont.-in-part of U. S. 6,022,643.  
 CODEN: USXXAM  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 2  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 6352798	B1	20020305	US 2000-492569	200001 27
US 6022643	A	20000208	US 1997-986846	199712 08
<--				<--
PRIORITY APPLN. INFO.:			US 1997-986846	A2 199712 08
<--				<--

OTHER SOURCE(S) : MARPAT 136:219519  
 AB Novel fluorinated boronate-based compds. which act as anion receptors in nonaq. **battery electrolytes** are provided. When added to nonaq. **battery electrolytes**, the fluorinated boronate-based compds. of the invention enhance ionic cond. and cation transference no. of nonaq. **battery electrolytes**. The fluorinated boronate-based anion receptors include different fluorinated alkyl and aryl groups.  
 IT 534-22-5, 2-Methylfuran 2923-17-3, Lithium trifluoroacetate 7439-93-2, Lithium, uses 7791-03-9, Lithium perchlorate 87187-79-9, Propanoic acid, pentafluoro-, lithium salt 87442-01-1, Benzoic acid, pentafluoro-, lithium salt  
 RL: DEV (Device component use); USES (Uses)  
 (Ph boron-based compds. as anion receptors for nonaq. **battery electrolytes**)  
 RN 534-22-5 HCPLUS  
 CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



RN 2923-17-3 HCPLUS  
 CN Acetic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)

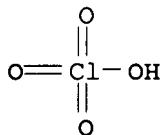


## ● Li

RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



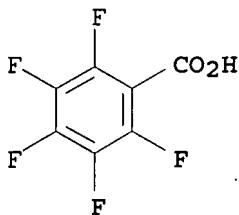
## ● Li

RN 87187-79-9 HCAPLUS  
 CN Propanoic acid, pentafluoro-, lithium salt (9CI) (CA INDEX NAME)

$\text{HO}_2\text{C}-\text{CF}_2-\text{CF}_3$

## ● Li

RN 87442-01-1 HCAPLUS  
 CN Benzoic acid, pentafluoro-, lithium salt (9CI) (CA INDEX NAME)



## ● Li

IC ICM H01M006-14  
 INCL 429324000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 27  
 ST battery electrolyte anion receptor fluorinated  
 boronate based compd  
 IT Battery electrolytes  
 Ionic conductivity  
 (Ph boron-based compds. as anion receptors for nonaq.  
 battery electrolytes)  
 IT Polyanilines  
 Polyoxyalkylenes, uses  
 Polysulfides  
 Transition metal chalcogenides  
 Transition metal oxides  
 RL: DEV (Device component use); USES (Uses)  
 (Ph boron-based compds. as anion receptors for nonaq.  
 battery electrolytes)  
 IT Oxides (inorganic), uses  
 RL: DEV (Device component use); USES (Uses)  
 (lithiated; Ph boron-based compds. as anion receptors for nonaq.  
 battery electrolytes)  
 IT Lithium alloy, base  
 RL: DEV (Device component use); USES (Uses)  
 (Ph boron-based compds. as anion receptors for nonaq.  
 battery electrolytes)  
 IT 75-05-8, Acetonitrile, uses 96-48-0,  $\gamma$ -Butyrolactone  
 96-49-1, Ethylene carbonate 107-31-3, Methyl formate 108-32-7,  
 Propylene carbonate 109-87-5, Dimethoxymethane 109-99-9, Thf,  
 uses 110-71-4, 1,2-Dimethoxyethane 115-10-6, Dimethyl ether  
 126-33-0, Sulfolane 534-22-5, 2-Methylfuran 616-38-6,  
 Dimethyl carbonate 646-06-0, 1,3-Dioxolane 872-50-4,  
 1-Methyl-2-pyrrolidinone, uses 1072-47-5 1072-71-5,  
 2,5-Dimercapto-1,3,4-thiadiazole 2923-17-3, Lithium  
 trifluoroacetate 7439-93-2, Lithium, uses 7440-44-0D,  
 Carbon, intercalation compd., with lithium 7447-41-8, Lithium  
 chloride, uses 7550-35-8, Lithium bromide 7789-24-4, Lithium  
 fluoride, uses 7791-03-9, Lithium perchlorate 9011-17-0,  
 Hexafluoropropylene-vinylidene fluoride copolymer 10377-51-2,  
 Lithium iodide 12031-65-1, Lithium nickel oxide linio2  
 12057-17-9, Lithium manganese oxide limn2o4 12162-79-7, Lithium  
 manganese oxide limno2 12190-79-3, Cobalt lithium oxide colio2  
 12201-18-2, Lithium molybdenum sulfide limos2 14283-07-9, Lithium  
 tetrafluoroborate 18424-17-4, Lithium hexafluoroantimonate  
 19836-78-3, 3-Methyl-2-oxazolidinone 21324-40-3, Lithium

hexafluorophosphate 25014-41-9, Polyacrylonitrile 25233-30-1, Polyaniline 25322-68-3, PEO 25948-29-2, Carbon disulfide, homopolymer 29935-35-1, Lithium hexafluoroarsenate 39448-96-9, Graphite lithium 55326-82-4, Lithium titanium sulfide litis2 55886-04-9, Lithium niobium selenide Li<sub>3</sub>NbSe<sub>3</sub> 87187-79-9, Propanoic acid, pentafluoro-, lithium salt 87442-01-1, Benzoic acid, pentafluoro-, lithium salt 131344-56-4, Cobalt lithium nickel oxide 138187-48-1, Lithium vanadium oxide Li<sub>1.2</sub>V<sub>2</sub>O<sub>5</sub> 152991-98-5, Aluminum lithium nickel oxide 159967-11-0, Lithium magnesium nickel oxide 180984-62-7, Lithium nickel titanium oxide 256345-13-8, Lithium vanadium oxide Li<sub>2.5</sub>V<sub>6</sub>O<sub>13</sub>

RL: DEV (Device component use); USES (Uses)  
(Ph boron-based compds. as anion receptors for nonaq.  
**battery electrolytes**)

IT 23542-71-4P 365458-32-8P 365458-33-9P 365458-34-0P  
365458-35-1P 365458-36-2P 365458-37-3P 365458-38-4P  
365458-39-5P 365458-40-8P 402564-35-6P 402564-36-7P  
402564-37-8P 402564-38-9P 402564-39-0P  
RL: DEV (Device component use); MOA (Modifier or additive use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(Ph boron-based compds. as anion receptors for nonaq.  
**battery electrolytes**)

REFERENCE COUNT: 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L117 ANSWER 8 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2002:103441 HCAPLUS  
DOCUMENT NUMBER: 136:153869  
TITLE: Lithium-sulfur **batteries** with high capacity and good rate capability  
INVENTOR(S): Jung, Yongju; Kim, Seok; Choi, Yunsuk; Choi, Soo Seok; Lee, Jeawoan; Hwang, Duck Chul; Kim, Joo Soak  
PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea  
SOURCE: Eur. Pat. Appl., 10 pp.  
CODEN: EPXXDW  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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EP 1178555	A2	20020206	EP 2001-117788	200108 02
<--				
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
KR 2002011562	A	20020209	KR 2000-44900	200008 02
<--				
KR 2002011563	A	20020209	KR 2000-44901	200008 02
<--				

JP 2002075446	A2	20020315	JP 2001-213286	200107 13
<--				
US 2002045102	A1	20020418	US 2001-918463	200108 01
<--				
CN 1336696	A	20020220	CN 2001-132527	200108 02
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PRIORITY APPLN. INFO.:			KR 2000-44900	A 200008 02
<--				
KR 2000-44901			A 200008 02	
<--				

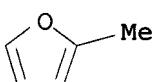
AB A lithium-sulfur **battery** includes a neg. electrode, a pos. electrode, and an **electrolyte**. The neg. electrode includes a neg. active material selected from materials in which lithium intercalation reversibly occur, lithium alloy or lithium metal. The pos. electrode includes at least one of elemental sulfur and organosulfur compds. for a pos. active material, and an elec. conductive material. The **electrolyte** includes at least two groups selected from a weak polar solvent group, a strong polar solvent group and a lithium protection solvent group, where the **electrolyte** includes at least one or more solvents selected from the same group. The **electrolyte** may optionally include one or more **electrolyte salts**.

IT 110-00-9, Furan 534-22-5, 2-Methylfuran  
625-86-5, 2,5-Dimethylfuran 7439-93-2, Lithium,  
uses 7791-03-9, Lithium perchlorate 33454-82-9,  
Lithium triflate 90076-65-6  
RL: DEV (Device component use); USES (Uses)  
(lithium-sulfur **batteries** with high capacity and good  
rate capability)

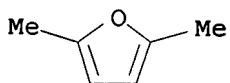
RN 110-00-9 HCAPLUS  
CN Furan (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 534-22-5 HCAPLUS  
CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



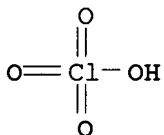
RN 625-86-5 HCAPLUS  
CN Furan, 2,5-dimethyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

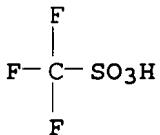
Li

RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



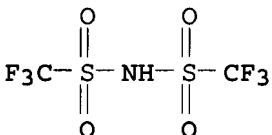
● Li

RN 33454-82-9 HCAPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

IC ICM H01M010-40  
 ICS H01M010-36  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium sulfur **batteries** good rate capability  
 IT **Battery electrolytes**  
     (lithium-sulfur **batteries** with high capacity and good  
     rate capability)  
 IT Group IIIA elements  
 Group IVA elements  
 Sulfides, uses  
 Transition metals, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
     (lithium-sulfur **batteries** with high capacity and good  
     rate capability)  
 IT Quaternary ammonium compounds, uses  
 RL: DEV (Device component use); USES (Uses)  
     (tetraalkyl; lithium-sulfur **batteries** with high  
     capacity and good rate capability)  
 IT Lithium alloy, base  
 RL: DEV (Device component use); USES (Uses)  
     (lithium-sulfur **batteries** with high capacity and good  
     rate capability)  
 IT 60-29-7, Diethyl ether, uses 67-68-5, Dmso, uses 68-12-2, Dmf,  
 uses 75-05-8, Acetonitrile, uses 75-21-8, Ethylene oxide, uses  
 77-78-1, Dimethyl sulfate 96-47-9, 2-Methyltetrahydrofuran  
 96-48-0,  $\gamma$ -Butyrolactone 105-58-8, Diethyl carbonate  
 108-88-3, Toluene, uses 109-99-9, Thf, uses 110-00-9,  
 Furan 110-71-4 111-55-7, Ethylene glycol diacetate 115-10-6,  
 Dimethyl ether 123-91-1, 1,4-Dioxan, uses 126-33-0, Sulfolane  
 127-19-5, Dimethyl acetamide 300-87-8, 3,5-Dimethylisoxazole  
 534-22-5, 2-Methylfuran 616-38-6, Dimethyl carbonate  
 616-42-2, Dimethyl sulfite 625-86-5, 2,5-Dimethylfuran  
 646-06-0, Dioxolane 680-31-9, Hexamethyl phosphoric triamide, uses  
 872-50-4, n-Methylpyrrolidone, uses 1072-47-5, 1,3-Dioxolane,  
 4-methyl 1330-20-7, Xylene, uses 7439-93-2, Lithium,  
 uses 7704-34-9, Sulfur, uses 7704-34-9D, Sulfur, org. compd.  
 7791-03-9, Lithium perchlorate 14283-07-9, Lithium  
 tetrafluoroborate 19836-78-3 21324-40-3, Lithium  
 hexafluorophosphate 33454-82-9, Lithium triflate  
 90076-65-6 147545-69-5, Ethylene glycol sulfite  
 RL: DEV (Device component use); USES (Uses)  
     (lithium-sulfur **batteries** with high capacity and good  
     rate capability)  
 IT 7429-90-5, Aluminum, uses 7439-88-5, Iridium, uses 7439-89-6,  
 Iron, uses 7439-92-1, Lead, uses 7439-96-5, Manganese, uses  
 7439-97-6, Mercury, uses 7439-98-7, Molybdenum, uses 7440-02-0,  
 Nickel, uses 7440-03-1, Niobium, uses 7440-04-2, Osmium, uses  
 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-15-5,  
 Rhenium, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium,  
 uses 7440-20-2, Scandium, uses 7440-21-3, Silicon, uses  
 7440-22-4, Silver, uses 7440-25-7, Tantalum, uses 7440-26-8,  
 Technetium, uses 7440-28-0, Thallium, uses 7440-31-5, Tin, uses  
 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 7440-43-9,  
 Cadmium, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses  
 7440-50-8, Copper, uses 7440-55-3, Gallium, uses 7440-56-4,  
 Germanium, uses 7440-57-5, Gold, uses 7440-62-2, Vanadium, uses  
 7440-65-5, Yttrium, uses 7440-66-6, Zinc, uses 7440-67-7,  
 Zirconium, uses 7440-74-6, Indium, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
     (lithium-sulfur **batteries** with high capacity and good

rate capability)  
 IT 74432-42-1, Lithium polysulfide  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (lithium-sulfur batteries with high capacity and good  
 rate capability)

L117 ANSWER 9 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2001:449916 HCAPLUS  
 DOCUMENT NUMBER: 135:45792  
 TITLE: Methods of purifying organic lithium  
 salts  
 INVENTOR(S): Gorkovenko, Alexander; Soloveichik, Grigorii L.  
 PATENT ASSIGNEE(S): Moltech Corporation, USA  
 SOURCE: U.S., 16 pp., Cont.-in-part of U.S. Ser. No.  
 127,468, abandoned.  
 CODEN: USXXAM  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 2  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 6248883	B1	20010619	US 1998-205873	199812 04
WO 2000006538	A1	20000210	WO 1999-US17347	199907 29
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W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
AU 9953293	A1	20000221	AU 1999-53293	199907 29
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PRIORITY APPLN. INFO.:		US 1998-127468	B2	199807 31
		US 1998-205873	A	199812 04
		WO 1999-US17347	W	199907 29
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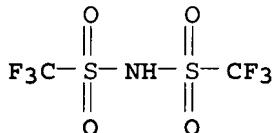
AB Provided are methods of purifn. of an org. lithium  
 salt comprising the steps of: (a) dissolving an impure org.  
 lithium salt in a soln. comprising an org.

complexing solvent; (b) crystg. from said soln. a solid solvate complex comprising said lithium salt and said org. complexing solvent; (c) sepg. said solid solvate complex from said soln.; (d) dissocg. said solid solvate complex to yield: (i) said lithium salt in a solid form, and, (ii) a volatile compn. comprising said org. complexing solvent; and, (e) removing said volatile compn. to yield said lithium salt in a solid form of purity greater than the purity of said impure lithium salt. The present invention also pertains to electrolytes for elec. current producing cells comprising such purified lithium salts. Thus,  $(CF_3SO_2)_2NLi$  was purified by crystn. of the 1,4-dioxane complex and heating under vacuum at 125° to remove the dioxane.

IT 90076-65-6P, Lithium bis(trifluoromethylsulfonyl)imide  
 RL: DEV (Device component use); PUR (Purification or recovery); PREP (Preparation); USES (Uses)  
 (purifn. by crystn. of ether complex for use as **battery electrolyte**)

RN 90076-65-6 HCAPLUS

CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

IT 110-00-9, Furan  
 RL: NUU (Other use, unclassified); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)  
 (purifn. of org. lithium salts by ether complexation, crystn. and removal)

RN 110-00-9 HCAPLUS

CN Furan (7CI, 8CI, 9CI) (CA INDEX NAME)



IT 7439-93-2DP, Lithium, salts, preparation  
 RL: PUR (Purification or recovery); PREP (Preparation)  
 (purifn. of org. lithium salts by ether complexation, crystn. and removal)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 344563-88-8P 344563-90-2P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);  
 RACT (Reactant or reagent)  
 (purifn. of org. lithium salts by ether  
 complexation, crystn. and removal)

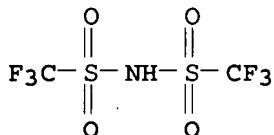
RN 344563-88-8 HCPLUS

CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
 lithium salt, compd. with 1,4-dioxane (2:3) (9CI) (CA INDEX NAME)

CM 1

CRN 90076-65-6

CMF C2 H F6 N O4 S2 . Li

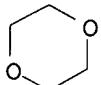


● Li

CM 2

CRN 123-91-1

CMF C4 H8 O2



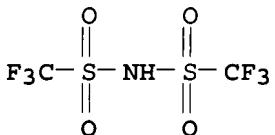
RN 344563-90-2 HCPLUS

CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
 lithium salt, compd. with 1,4-dioxane (1:2) (9CI) (CA INDEX NAME)

CM 1

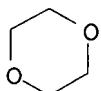
CRN 90076-65-6

CMF C2 H F6 N O4 S2 . Li



● Li

CM 2

CRN 123-91-1  
CMF C4 H8 O2

IC ICM C07D281-02  
 ICS C07D207-36  
 INCL 540544000  
 CC 21-2 (General Organic Chemistry)  
 Section cross-reference(s): 52  
 ST org lithium salt purifn ether complexation;  
 electrolyte lithium salt purifn  
 IT Ethers, reactions  
 RL: NUU (Other use, unclassified); RCT (Reactant); RACT (Reactant or  
 reagent); USES (Uses)  
 (complexation of ethers with lithium for purifn. of org.  
 lithium salts)  
 IT Phenols, preparation  
 Sulfonamides  
 RL: PUR (Purification or recovery); PREP (Preparation)  
 (lithium salts)  
 IT Carboxylic acids, preparation  
 Sulfonic acids, preparation  
 RL: PUR (Purification or recovery); PREP (Preparation)  
 (lithium salts; purifn. of org.  
 lithium salts by ether complexation, crystn.  
 and removal)  
 IT Battery electrolytes  
 (purifn. of lithium bis(trifluoromethanesulfonyl)imide for use as  
 battery electrolyte)  
 IT 90076-65-6P, Lithium bis(trifluoromethylsulfonyl)imide  
 RL: DEV (Device component use); PUR (Purification or recovery); PREP  
 (Preparation); USES (Uses)  
 (purifn. by crystn. of ether complex for use as battery  
 electrolyte)  
 IT 60-29-7, Diethyl ether, reactions 108-20-3, Diisopropyl ether  
 109-99-9, Tetrahydrofuran, reactions 110-00-9, Furan  
 110-87-2, Dihydropyran 111-43-3, Dipropyl ether 115-10-6,  
 Dimethyl ether 123-91-1, 1,4-Dioxane, reactions 142-68-7,  
 Tetrahydropyran 142-96-1, Dibutyl ether 505-68-0, 1,4-Dioxepane  
 540-67-0, Ethyl methyl ether 557-17-5, Methyl propyl ether  
 592-90-5, Oxepane 598-53-8, Methyl isopropyl ether 628-28-4,  
 Methyl butyl ether 929-56-6, Methyl octyl ether 1634-04-4,  
 Methyl tert-butyl ether 4747-07-3, Methyl hexyl ether 6572-91-4,  
 1,4-Dioxocane 6572-98-1, Oxocane 10143-60-9, Di(2-ethylhexyl)  
 ether 13423-15-9, 3-Methyltetrahydrofuran  
 RL: NUU (Other use, unclassified); RCT (Reactant); RACT (Reactant or  
 reagent); USES (Uses)  
 (purifn. of org. lithium salts by ether  
 complexation, crystn. and removal)  
 IT 7439-93-2DP, Lithium, salts, preparation  
 RL: PUR (Purification or recovery); PREP (Preparation)

(purifn. of org. lithium salts by ether complexation, crystn. and removal)

IT 344563-88-8P 344563-90-2P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(purifn. of org. lithium salts by ether complexation, crystn. and removal)

IT 78-78-4, Isopentane 95-47-6, o-Xylene, uses 96-37-7,

Methylcyclopentane 98-82-8, Isopropylbenzene 106-42-3, p-Xylene, uses 107-83-5, Isohexane 108-38-3, m-Xylene, uses 108-67-8,

Mesitylene, uses 108-87-2, Methylcyclohexane 108-88-3, Toluene, uses 108-90-7, Chlorobenzene, uses 109-66-0, Pentane, uses

110-54-3, Hexane, uses 110-82-7, Cyclohexane, uses 111-65-9,

Octane, uses 111-84-2, Nonane 124-18-5, Decane 287-92-3,

Cyclopentane 291-64-5, Cycloheptane 292-64-8, Cyclooctane

540-84-1, Isooctane 25321-09-9, Diisopropylbenzene 25321-22-6,

Dichlorobenzene 25340-17-4, Diethylbenzene 25550-14-5,

Methylethylbenzene

RL: NUU (Other use, unclassified); USES (Uses)

(solvent for purifn. of org. lithium salts by ether complexation, crystn. and removal)

REFERENCE COUNT: 27 THERE ARE 27 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L117 ANSWER 10 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2000:95943 HCAPLUS

DOCUMENT NUMBER: 132:125353

TITLE: Boron compounds as anion binding agents for nonaqueous **battery electrolytes**

INVENTOR(S): Lee, Hung Sui; Yang, Xia-oing; McBreen, James; Xiang, Caili

PATENT ASSIGNEE(S): Brookhaven Science Associates, USA

SOURCE: U.S., 11 pp.  
CODEN: USXXAM

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

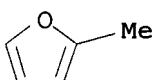
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 6022643	A	20000208	US 1997-986846	199712 08
US 6352798	B1	20020305	US 2000-492569	200001 27
PRIORITY APPLN. INFO.:			US 1997-986846	A2 199712 08

AB Novel fluorinated boron-based compds. which act as anion receptors in nonaq. **battery electrolytes** are provided. The anion receptor is a compd. of formula Q3B, where Q is a F-bearing moiety selected from the group of (CF<sub>3</sub>)<sub>2</sub>CHO,

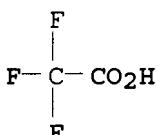
$(CF_3)_2C(C_6H_5)O$ ,  $(CF_3)_3CO$ ,  $FC_6H_4O$ ,  $F_2C_6H_3O$ ,  $F_4C_6HO$ ,  $C_6F_5O$ ,  $CF_3C_6H_4O$ , and  $(CF_3)_2C_6H_3O$ . When added to nonaq. **battery electrolytes**, the fluorinated boron-based compds. of the invention enhance ionic cond. and cation transference no. of nonaq. **electrolytes**. The fluorinated boron-based anion receptors include borane and borate compds. bearing different fluorinated alkyl and aryl groups.

IT 534-22-5, 2-Methylfuran 2923-17-3, Lithium trifluoroacetate 7439-93-2, Lithium, uses 7439-93-2D, Lithium, intercalation compd. with carbon, uses 7791-03-9 87187-79-9 87442-01-1, Benzoic acid, pentafluoro-, lithium salt  
 RL: DEV (Device component use); USES (Uses)  
 (boron compds. as anion binding agents for nonaq. **battery electrolytes**)

RN 534-22-5 HCAPLUS  
 CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



RN 2923-17-3 HCAPLUS  
 CN Acetic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

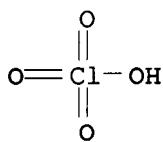
RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



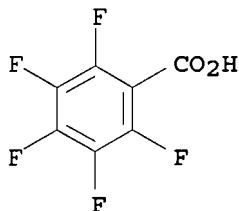
## ● Li

RN 87187-79-9 HCAPLUS  
 CN Propanoic acid, pentafluoro-, lithium salt (9CI) (CA INDEX NAME)



## ● Li

RN 87442-01-1 HCAPLUS  
 CN Benzoic acid, pentafluoro-, lithium salt (9CI) (CA INDEX NAME)



## ● Li

IC ICM H01M006-14  
 INCL 429324000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST battery electrolyte fluorinated boron based  
 anion receptor  
 IT Battery electrolytes  
 Ionic conductivity  
 (boron compds. as anion binding agents for nonaq. battery  
 electrolytes)  
 IT Intercalation compounds  
 Polyanilines  
 Polyoxyalkylenes, uses  
 Transition metal chalcogenides  
 Transition metal oxides  
 RL: DEV (Device component use); USES (Uses)  
 (boron compds. as anion binding agents for nonaq. battery  
 electrolytes)  
 IT Oxides (inorganic), uses  
 RL: DEV (Device component use); USES (Uses)

(intercalation compd. with lithium; boron compds. as anion binding agents for nonaq. **battery electrolytes**)

## IT Secondary batteries

(lithium; boron compds. as anion binding agents for nonaq. **battery electrolytes**)

## IT Polysulfides

RL: DEV (Device component use); USES (Uses)  
(org.; boron compds. as anion binding agents for nonaq. **battery electrolytes**)

## IT Lithium alloy

RL: DEV (Device component use); USES (Uses)  
(boron compds. as anion binding agents for nonaq. **battery electrolytes**)

IT 75-05-8, Acetonitrile, uses 96-48-0,  $\gamma$ -Butyrolactone  
96-49-1, Ethylene carbonate 107-31-3, Methyl formate 108-32-7,  
Propylene carbonate 109-87-5, Dimethoxymethane 109-99-9, uses  
110-71-4, 1,2-Dimethoxyethane 115-10-6, Dimethyl ether 126-33-0,  
Sulfolane 534-22-5, 2-Methylfuran 616-38-6, Dimethyl  
carbonate 646-06-0, 1,3-Dioxolane 872-50-4, uses 1072-47-5,  
1,3-Dioxolane, 4-Methyl 1072-71-5, 2,5-Dimercapto-1,3,4-  
thiadiazole 2923-17-3, Lithium trifluoroacetate  
7439-93-2, Lithium, uses 7439-93-2D, Lithium,  
intercalation compd. with carbon, uses 7440-44-0D, Carbon,  
intercalation compd. with lithium, uses 7447-41-8, Lithium  
chloride, uses 7550-35-8, Lithium bromide 7789-24-4, Lithium  
fluoride, uses 7791-03-9 9011-17-0, Hexafluoropropylene-  
vinylidene fluoride copolymer 10377-51-2, Lithium iodide  
12031-65-1, Lithium nickel oxide linio2 12057-17-9, Lithium  
manganese oxide limn2o4 12162-79-7, Lithium manganese oxide limno2  
12190-79-3, Cobalt lithium oxide colio2 12201-18-2, Lithium  
molybdenum sulfide limos2 14283-07-9, Lithium tetrafluoroborate  
18424-17-4, Lithium hexafluoroantimonate 19836-78-3,  
3-Methyl-2-oxazolidinone 21324-40-3, Lithium hexafluorophosphate  
25014-41-9, Polyacrylonitrile 25233-30-1, Polyaniline 25322-68-3  
25948-29-2, Carbon disulfide, homopolymer 29935-35-1, Lithium  
hexafluoroarsenate 39448-96-9, Graphite lithium 55326-82-4,  
Lithium titanium sulfide litis2 55886-04-9, Lithium niobium  
selenide Li3NbSe3 87187-79-9 87442-01-1, Benzoic  
acid, pentafluoro-, lithium salt 138187-48-1,  
Lithium vanadium oxide Lii,2V2O5 256345-13-8, Lithium vanadium  
oxide (Li2.5V6O13)

RL: DEV (Device component use); USES (Uses)  
(boron compds. as anion binding agents for nonaq. **battery electrolytes**)

IT 121-43-7 659-18-7 755-53-3 856-46-2 1095-03-0 1109-15-5  
6919-80-8 32766-52-2 146355-12-6 210834-28-9 210834-35-8  
210834-37-0 210834-40-5 210834-42-7

RL: MOA (Modifier or additive use); TEM (Technical or engineered  
material use); USES (Uses)

(boron compds. as anion binding agents for nonaq. **battery electrolytes**)

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

L117 ANSWER 11 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1999:497044 HCAPLUS

DOCUMENT NUMBER: 131:104539

TITLE: Secondary batteries with hybrid

inorganic-organic electrodes formed from conductive polymers and active inorganic substances

INVENTOR(S): Gomez Romero, Pedro; Lira Cantu, Monica; Casan Pastor, Nieves

PATENT ASSIGNEE(S): Consejo Superior de Investigaciones Cientificas, Spain

SOURCE: Span., 11 pp.

CODEN: SPXXAD

DOCUMENT TYPE: Patent

LANGUAGE: Spanish

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
ES 2120324	A1	19981016	ES 1995-599	199503 27
ES 2120324	B1	19990701	ES 1995-599	199503 27

AB The secondary batteries contain a lithium or lithium alloy anode, an electrolyte, and a hybrid cathode. The hybrid cathode consists of a conductive polymer doped with an inorg. substance having oxidn.-redn. capacity. The anode may also be a hybrid electrode. The battery can be used in elec. vehicles, household appliances, sensors and in the fields of catalysis and electrocatalysis. In an example, the battery comprised a Li anode, a polypropylene separator impregnated with a soln. of LiClO<sub>4</sub> in propylene carbonate, and a polypyrrole/H<sub>3</sub>PMo<sub>12</sub>O<sub>40</sub> cathode.

IT 109-97-7D, Pyrrole, polymers 7439-93-2, Lithium, uses  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
(secondary batteries with hybrid electrodes contg. conductive polymers and active inorg. substances)

RN 109-97-7 HCPLUS  
CN 1H-Pyrrole (9CI) (CA INDEX NAME)



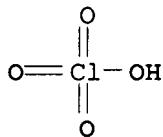
RN 7439-93-2 HCPLUS  
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 7791-03-9, Lithium perchlorate

RL: NUU (Other use, unclassified); USES (Uses)  
 (secondary **batteries** with hybrid electrodes contg.  
 conductive polymers and active inorg. substances)

RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IC ICM H01M004-36  
 ICS H01M004-60  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 47, 67  
 ST secondary **battery** hybrid polymer cathode; lithium  
 secondary **battery** hybrid cathode; cathode hybrid org inorg  
 secondary **battery**  
 IT Electric appliances  
 Electric vehicles  
 Sensors  
 (batteries for; secondary **batteries** with  
 hybrid electrodes contg. conductive polymers and active inorg.  
 substances)  
 IT Catalysis  
 (electrocatalysis, batteries for; secondary  
 batteries with hybrid electrodes contg. conductive  
 polymers and active inorg. substances)  
 IT Secondary **batteries**  
 (lithium; secondary **batteries** with hybrid electrodes  
 contg. conductive polymers and active inorg. substances)  
 IT Battery cathodes  
 Battery electrodes  
 Conducting polymers  
 Secondary **batteries**  
 (secondary **batteries** with hybrid electrodes contg.  
 conductive polymers and active inorg. substances)  
 IT Cyanides (inorganic), uses  
 Heteropoly acids  
 Oxides (inorganic), uses  
 Polyanilines  
 Sulfides, uses  
 RL: DEV (Device component use); TEM (Technical or engineered  
 material use); USES (Uses)  
 (secondary **batteries** with hybrid electrodes contg.  
 conductive polymers and active inorg. substances)  
 IT Lithium alloy  
 RL: DEV (Device component use); TEM (Technical or engineered  
 material use); USES (Uses)  
 (secondary **batteries** with hybrid electrodes contg.  
 conductive polymers and active inorg. substances)  
 IT 62-53-3D, Aniline, polymers 106-50-3D, p-Phenylenediamine,  
 polymers 109-97-7D, Pyrrole, polymers 275-51-4D,

Azulene, polymers 1313-13-9, Manganese oxide MnO<sub>2</sub>, uses 1313-27-5, Molybdenum oxide MoO<sub>3</sub>, uses 1314-35-8, Tungsten oxide WO<sub>3</sub>, uses 1314-62-1, Vanadium oxide V<sub>2</sub>O<sub>5</sub>, uses 1317-33-5, Molybdenum sulfide MoS<sub>2</sub>, uses 1317-38-0, Copper oxide CuO, uses 7439-93-2, Lithium, uses 12026-57-2, H<sub>3</sub>PMo12O<sub>40</sub> 12031-65-1, Lithium nickel oxide LiNiO<sub>2</sub> 12036-22-5, Tungsten oxide WO<sub>2</sub> 12037-42-2, Vanadium oxide V<sub>6</sub>O<sub>13</sub> 12039-13-3, Titanium sulfide TiS<sub>2</sub> 12057-17-9, Lithium manganese oxide LiMn<sub>2</sub>O<sub>4</sub> 12190-79-3, Lithium cobalt oxide LiCoO<sub>2</sub> 18868-43-4, Molybdenum oxide MoO<sub>2</sub> 25168-37-0, Poly(p-phenylenediamine) 25233-30-1, Polyaniline 30604-81-0, Polypyrrole 39448-96-9, Graphite, compd. with lithium 72785-69-4, Lithium alloy, Li,Al 82451-56-7, Polyazulene

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(secondary batteries with hybrid electrodes contg. conductive polymers and active inorg. substances)

IT 60-00-4, EDTA, uses 67-42-5, EGTA 75-05-8, Acetonitrile, uses 108-32-7, Propylene carbonate 139-13-9 482-54-2, Cyclohexanediaminetetraacetic acid 4408-81-5, PDTA 7601-90-3, Perchloric acid, uses 7664-93-9, Sulfuric acid, uses 7727-54-0, Ammonium persulfate 7791-03-9, Lithium perchlorate

RL: NUU (Other use, unclassified); USES (Uses)

(secondary batteries with hybrid electrodes contg. conductive polymers and active inorg. substances)

L117 ANSWER 12 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1997:437343 HCAPLUS

DOCUMENT NUMBER: 127:196790

TITLE: Polymers and copolymers of pyrrole and thiophene as electrodes in lithium cells

AUTHOR(S): Sanchez De Pinto, M. I.; Mishima, H. T.; Lopez De Mishima, B. A.

CORPORATE SOURCE: Inst. Cs. Quimicas, F.A.A., Univ. Nacional Santiago de Estero, Santiago del Estero, 4200, Argent.

SOURCE: Journal of Applied Electrochemistry (1997), 27(7), 831-838

CODEN: JAELBJ; ISSN: 0021-891X

PUBLISHER: Chapman & Hall

DOCUMENT TYPE: Journal

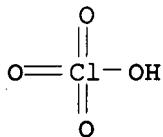
LANGUAGE: English

AB The performance of pyrrole and thiophene polymer electrodes in lithium cells was examd. in the lithium perchlorate-propylene carbonate electrolyte by cyclic voltammetry. Polypyrrole films were synthesized in 'wet' and 'dry' conditions; pyrrole and thiophene copolymers were prep'd. at different potentials and bilayers were prep'd. by sequential deposition of polythiophene (PTh) and polypyrrole (PPy) films. The polymers were cycled between 2.0 V and 4.0 V in the lithium cells. The effects of disconnecting the electrodes from the cell on the behavior of the polymers regarding doping and coulombic efficiency were also studied. The cycling performance of the 'wet' PPy is better than 'dry' PPy, bilayer PTh/PPy and copolymers. No mixed behavior was obsd. for a bilayer where the inner layer was polythiophene and the outer layer was polypyrrole with a thickness PPy/PTh ratio equal to ten. The copolymer prep'd. at 3.9 V vs. Li/Li<sup>+</sup> showed the higher energy capacity in W h kg<sup>-1</sup> calcd. from the anodic charge.

IT 7791-03-9, Lithium perchlorate  
RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)

(cyclic voltammetry of polypyrrole and polypyrrole-polythiophene bilayers and pyrrole-thiophene copolymers in lithium perchlorate-propylene carbonate electrolyte)

RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 110-02-1, Thiophene  
 RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
 (electrochem. polymn. with and without pyrrole in lithium  
 perchlorate-propylene carbonate electrolyte)  
 RN 110-02-1 HCAPLUS  
 CN Thiophene (8CI, 9CI) (CA INDEX NAME)



IT 109-97-7, Pyrrole  
 RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
 (electrochem. polymn. with and without thiophene in lithium  
 perchlorate-propylene carbonate electrolyte)  
 RN 109-97-7 HCAPLUS  
 CN 1H-Pyrrole (9CI) (CA INDEX NAME)



IT 7439-93-2, Lithium, uses  
 RL: DEV (Device component use); PRP (Properties); USES (Uses)  
 (polymers and copolymers of pyrrole and thiophene as electrodes  
 in lithium cells)  
 RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

CC 72-2 (Electrochemistry)  
 Section cross-reference(s): 35, 36, 52  
 IT Polymerization  
 (electrochem.; of pyrrole and thiophene and pyrrole with

thiophene in lithium perchlorate-propylene carbonate  
electrolyte)

IT Cyclic voltammetry  
(of polypyrrole and polypyrrole-polythiophene bilayers and  
pyrrole-thiophene copolymers in lithium perchlorate-propylene  
carbonate electrolyte)

IT Battery cathodes  
Battery electrodes  
(polypyrrole and polypyrrole-polythiophene bilayers and  
pyrrole-thiophene copolymers)

IT 89298-12-4, Pyrrole-thiophene copolymer  
RL: DEV (Device component use); PRP (Properties); RCT (Reactant);  
RACT (Reactant or reagent); USES (Uses)  
(cyclic voltammetry in lithium perchlorate-propylene carbonate  
electrolyte: polymers and copolymers of pyrrole and  
thiophene as electrodes in lithium cells)

IT 7791-03-9, Lithium perchlorate  
RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)  
(cyclic voltammetry of polypyrrole and polypyrrole-polythiophene  
bilayers and pyrrole-thiophene copolymers in lithium  
perchlorate-propylene carbonate electrolyte)

IT 30604-81-0, Polypyrrole  
RL: DEV (Device component use); PRP (Properties); RCT (Reactant);  
RACT (Reactant or reagent); USES (Uses)  
(cyclic voltammetry of polypyrrole and polypyrrole-polythiophene  
bilayers in lithium perchlorate-propylene carbonate  
electrolyte: polymers and copolymers of pyrrole and  
thiophene as electrodes in lithium cells)

IT 25233-34-5, Polythiophene  
RL: DEV (Device component use); PRP (Properties); RCT (Reactant);  
RACT (Reactant or reagent); USES (Uses)  
(cyclic voltammetry of polypyrrole-polythiophene bilayers in  
lithium perchlorate-propylene carbonate electrolyte:  
polymers and copolymers of pyrrole and thiophene as electrodes in  
lithium cells)

IT 110-02-1, Thiophene  
RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
(electrochem. polymn. with and without pyrrole in lithium  
perchlorate-propylene carbonate electrolyte)

IT 109-97-7, Pyrrole  
RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
(electrochem. polymn. with and without thiophene in lithium  
perchlorate-propylene carbonate electrolyte)

IT 7439-93-2, Lithium, uses  
RL: DEV (Device component use); PRP (Properties); USES (Uses)  
(polymers and copolymers of pyrrole and thiophene as electrodes  
in lithium cells)

L117 ANSWER 13 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1997:129574 HCAPLUS  
DOCUMENT NUMBER: 126:133588  
TITLE: Nonaqueous electrolyte  
batteries using electrolytes  
containing self discharge inhibitors  
INVENTOR(S): Jinno, Maruo; Uehara, Mayumi; Sakurai, Atsushi;  
Nishio, Koji; Saito, Toshihiko  
PATENT ASSIGNEE(S): Sanyo Denki Kk, Japan  
SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.  
CODEN: JKXXAF  
DOCUMENT TYPE: Patent

LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 08321312	A2	19961203	JP 1995-150844	199505 24
<--				
PRIORITY APPLN. INFO.:		JP 1995-150844		
		199505 24		
<--				

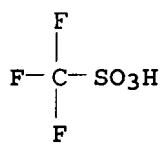
AB Li batteries use electrolytes contg. LiCF<sub>3</sub>SO<sub>3</sub> or LiPF<sub>6</sub> dissolved in high dielec. const. solvent selected from ethylene carbonate, propylene carbonate, and butylene carbonate; where the electrolytes contain 1-20 vol.% additive selected from triethylamine, n-butylamine, aniline, tri-Me hydroxylamine, 1-dimethylamino-2-methoxy ethane, acetonitrile, acrylonitrile, 3-methoxy propionitrile, benzonitrile, nitromethane, nitroethane, N,N-dimethylacetamide, N,N-dimethylformamide, formamide, N-methyl-2-pyrrolidone, N,N'-dimethyl imidazolidinone, isoxazole, 3,5-di-Me isoxazole, 3-methyl-2-oxazolidone, 1,2,3-oxadiazole, N-Me morpholine, di-Me sulfide, Et Me sulfide, 2-Me thiophene, 1-butane thiol, benzenethiol, di-Me sulfate, di-Et sulfate, di-Me sulfite, di-Et sulfite, butadienesulfone, 3-Me sulfolene, 1,4-thioxane, phenoxathiin, 1,4-thiazine, thiomorpholine, pyridine, 1,3-dimethyl-2-imidazolidinone, DMSO, di-Me sulfone, Me Et sulfonate, and di-Me sulfinate. The electrolytes may contain 1,2-dimethoxyethane. Since the additives react with Li in anodes and the solvents and the solutes in the electrolytes to form coatings on the anodes for prevention of the reaction between the electrolytes and the anodes, the batteries have improved storage property. These batteries have long shelf life.

IT 7439-93-2, Lithium, uses 33454-82-9, Lithium trifluoromethanesulfonate  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. electrolyte solns. contg. self discharge inhibitors for lithium batteries)

RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

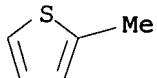
Li

RN 33454-82-9 HCAPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



## ● Li

IT 554-14-3, 2-Methylthiophene  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES  
 (Uses)  
 (self discharge inhibitors in nonaq. **electrolyte** solns.  
 for lithium **batteries**)  
 RN 554-14-3 HCAPLUS  
 CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01M006-16  
 ICS H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium **battery** electrolyte self discharge  
 inhibitor  
 IT **Battery electrolytes**  
 (self discharge inhibitors in nonaq. **electrolyte** solns.  
 for lithium **batteries**)  
 IT 7439-93-2, Lithium, uses 21324-40-3, Lithium  
 hexafluorophosphate 33454-82-9, Lithium  
 trifluoromethanesulfonate  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. **electrolyte** solns. contg. self discharge  
 inhibitors for lithium **batteries**)  
 IT 62-53-3, Aniline, uses 64-67-5, Diethyl sulfate 67-68-5,  
 Dimethylsulfoxide, uses 67-71-0, Dimethylsulfone 68-12-2,  
 N,N-Dimethylformamide, uses 75-05-8, Acetonitrile, uses 75-12-7,  
 Formamide, uses 75-18-3, Dimethylsulfide 75-52-5, Nitromethane,  
 uses 77-78-1, Dimethyl sulfate 79-24-3, Nitroethane 80-73-9,  
 N,N'-Dimethylimidazolidinone 100-47-0, Benzonitrile, uses  
 107-13-1, Acrylonitrile, uses 108-98-5, Benzenethiol, uses  
 109-02-4, N-Methylmorpholine 109-73-9, n-Butylamine, uses  
 109-79-5, 1-Butanethiol 110-67-8, 3-Methoxypropionitrile  
 110-86-1, Pyridine, uses 121-44-8, Triethylamine, uses 123-90-0,  
 Thiomorpholine 127-19-5, N,N-Dimethylacetamide 262-20-4,  
 Phenoxathiin 288-14-2, Isoxazole 288-43-7, 1,2,3-Oxadiazole  
 290-56-2, 1,4-Thiazine 290-57-3, 1,4-Thiazine 300-87-8,  
 3,5-Dimethylisoxazole 554-14-3, 2-Methylthiophene  
 616-42-2, Dimethyl sulfite 623-81-4, Diethyl sulfite 624-89-5,  
 Ethylmethylsulfide 666-15-9 872-50-4, N-Methyl-2-pyrrolidone,  
 uses 1193-10-8, 3-Methylsulfolene 1912-28-3, Methyl ethyl  
 sulfonate 3030-44-2 5669-39-6, Trimethylhydroxylamine  
 15980-15-1, 1,4-Thioxane 19836-78-3 28452-93-9, Butadienesulfone  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES

## (Uses)

(self discharge inhibitors in nonaq. **electrolyte** solns.  
for lithium **batteries**)

IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate  
110-71-4, 1,2-Dimethoxyethane 4437-85-8, Butylene carbonate

RL: DEV (Device component use); USES (Uses)

(solvents for nonaq. **electrolyte** solns. contg. self  
discharge inhibitors for lithium **batteries**)

L117 ANSWER 14 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1996:560789 HCAPLUS

DOCUMENT NUMBER: 125:226559

TITLE: Solid polymer **electrolyte** having  
increased conductivity and solid-state  
**battery** including this  
**electrolyte**

INVENTOR(S): Walker, Charles W. , Jr.; Plichta, Edward J.;  
Behl, Wishvender K.

PATENT ASSIGNEE(S): United States Dept. of the Army, USA

SOURCE: Statutory Invent. Regist., 3 pp.

CODEN: SRXXEV

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

## PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 1576	H1	19960806	US 1994-315213	199403 07

PRIORITY APPLN. INFO.: <--  
US 1994-315213 199403  
07

<--

AB The **electrolyte** includes a soln. of  $\geq 1$  Li  
salt in  $\geq 1$  polymer host and a dispersion of a Li  
ion-conducting solid ceramic material  $Li_{3+x}Ge_xV_{1-x}O_4$  ( $x = 0.2-0.8$ )  
or  $Li_{3.6}Ge_{0.6}V_{0.4}O_4$ . A solid-state **battery** comprises Li,  
Li alloy, or Li-intercalating compd. anode; an electrochem. active  
metallic inorg. compd. cathode; and the invention  
**electrolyte**.

IT 7439-93-2D, Lithium, polymer complexes

RL: DEV (Device component use); USES (Uses)  
(**battery electrolyte** contg. dispersed  
germanium lithium vanadium oxide)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 110-02-1D, Thiophene, alkyl derivs., polymers, lithium  
complexes

RL: TEM (Technical or engineered material use); USES (Uses)  
(**battery electrolyte** contg. dispersed  
germanium lithium vanadium oxide)

RN 110-02-1 HCAPLUS  
 CN Thiophene (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M006-16  
 INCL 429192000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38, 57  
 ST battery electrolyte lithium polymer complex  
 oxide; germanium vanadium lithium oxide battery  
 electrolyte  
 IT Battery electrolytes  
 (polymer-lithium complexes contg. dispersed germanium lithium  
 vanadium oxide)  
 IT 7439-93-2D, Lithium, polymer complexes 25322-68-3D, PEO,  
 lithium complexes  
 RL: DEV (Device component use); USES (Uses)  
 (battery electrolyte contg. dispersed  
 germanium lithium vanadium oxide)  
 IT 110-02-1D, Thiophene, alkyl derivs., polymers, lithium  
 complexes 9033-83-4D, Polyphenylene, lithium complexes  
 25067-58-7D, Polyacetylene, lithium complexes 25233-30-1D,  
 Polyaniline, lithium complexes 33411-63-1D, Thiophenol polymer,  
 lithium complexes  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (battery electrolyte contg. dispersed  
 germanium lithium vanadium oxide)  
 IT 111418-37-2, Germanium lithium vanadium oxide (Ge0.6Li3.6V0.4O4)  
 156166-24-4, Germanium lithium vanadium oxide (Ge0.2-0.8Li3.2-  
 3.8V0.2-0.8O4)  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (battery electrolyte from polymer-lithium  
 complexes contg. dispersed)

L117 ANSWER 15 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 1995:972683 HCAPLUS  
 DOCUMENT NUMBER: 124:39959  
 TITLE: Impedance analysis of electronically conducting  
 polymers  
 AUTHOR(S): Ferloni, P.; Mastragostino, M.; Meneghelli, L.  
 CORPORATE SOURCE: Dep. Physical Chemistry, Pavia Univ., Pavia,  
 27100, Italy  
 SOURCE: Electrochimica Acta (1996), 41(1),  
 27-33  
 CODEN: ELCAAV; ISSN: 0013-4686  
 PUBLISHER: Elsevier  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB The authors discuss in detail the equiv. circuits used to model the  
 impedance of electronically conducting polymer systems and the  
 procedure for the impedance anal. of these systems to account for  
 deviation from the ideal behavior. Impedance spectra of  
 pyrrole-based and thiophene-based polymers of different thickness  
 and at different values of injected charge in cells with  
 liq. electrolytes and solid polymer electrolytes

are reported, and the electrochem. parameters are evaluated and discussed.

IT 109-97-7, Pyrrole

RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
(electrochem. polymn. on stainless steel in acetonitrile contg.  
LiClO<sub>4</sub>)

RN 109-97-7 HCAPLUS

CN 1H-Pyrrole (9CI) (CA INDEX NAME)



IT 7439-93-2D, Lithium, PEO complex

RL: DEV (Device component use); NUU (Other use, unclassified); PRP  
(Properties); USES (Uses)  
(electrolyte in solid state cell with conducting  
polymer in impedance anal. study)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

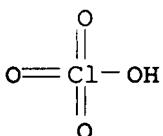
Li

IT 7791-03-9, Lithium perchlorate (LiClO<sub>4</sub>)

RL: DEV (Device component use); NUU (Other use, unclassified); PRP  
(Properties); USES (Uses)  
(electrolyte with PEO in solid state cell with  
conducting polymer in impedance anal. study)

RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

CC 72-2 (Electrochemistry)

Section cross-reference(s): 35, 36, 76

IT 109-97-7, Pyrrole 132387-61-2, N-(3,6-Dioxaheptyl)pyrrole

RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
(electrochem. polymn. on stainless steel in acetonitrile contg.  
LiClO<sub>4</sub>)

IT 7439-93-2D, Lithium, PEO complex 25322-68-3D, PEO, lithium  
complex

RL: DEV (Device component use); NUU (Other use, unclassified); PRP  
(Properties); USES (Uses)  
(electrolyte in solid state cell with conducting  
polymer in impedance anal. study)

IT 108-32-7, Propylene carbonate  
 RL: DEV (Device component use); NUU (Other use, unclassified); PRP  
 (Properties); USES (Uses)  
 (electrolyte with LiClO<sub>4</sub> in cell with conducting  
 polymer in impedance anal. study)

IT 25322-68-3, PEO  
 RL: DEV (Device component use); NUU (Other use, unclassified); PRP  
 (Properties); USES (Uses)  
 (electrolyte with LiClO<sub>4</sub> in solid state cell with  
 conducting polymer in impedance anal. study)

IT 7791-03-9, Lithium perchlorate (LiClO<sub>4</sub>)  
 RL: DEV (Device component use); NUU (Other use, unclassified); PRP  
 (Properties); USES (Uses)  
 (electrolyte with PEO in solid state cell with  
 conducting polymer in impedance anal. study)

L117 ANSWER 16 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1995:869783 HCAPLUS  
 DOCUMENT NUMBER: 123:261775  
 TITLE: **Nonaqueous-electrolyte**  
**batteries with improved**  
**electrolyte solutions for suppression of**  
**self discharge**  
 INVENTOR(S): Suemori, Atsushi; Shoji, Yoshihiro; Nishio,  
 Koji; Saito, Toshihiko  
 PATENT ASSIGNEE(S): Sanyo Electric Co, Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 4 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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JP 07192756	A2	19950728	JP 1993-327899	199312 24

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 PRIORITY APPLN. INFO.: JP 1993-327899

199312  
24

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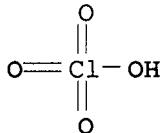
AB The batteries consist of cathodes and Li anodes and  
 electrolytes contg. LiPF<sub>6</sub>, LiClO<sub>4</sub>, LiCF<sub>3</sub>SO<sub>3</sub>, LiBF<sub>4</sub>, LiAsF<sub>6</sub>,  
 and/or LiN(CF<sub>3</sub>SO<sub>2</sub>)<sub>2</sub> and solvents contg. ethylene carbonate,  
 propylene carbonate, butylene carbonate, vinylene carbonate,  
 1,2-dimethoxyethane, di-Me carbonate, di-Et carbonate, Et Me  
 carbonate, THF, and/or 1,3-dioxolane, where the electrolyte  
 solns. are added with furan resins. The furan resins may be  
 phenol-furfural resins, furfural-acetone resins, furfuryl alc.  
 resins, and/or their derivs. The batteries suppress self  
 discharge and have good storage stability.

IT 7439-93-2, Lithium, uses  
 RL: DEV (Device component use); USES (Uses)  
 (anode; nonaq. electrolyte solns. contg. furan resins  
 for Li batteries for suppressing self discharge)

RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

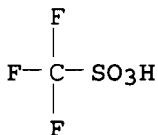
Li

IT 7791-03-9, Lithium perchlorate 33454-82-9, Lithium trifluoromethanesulfonate 90076-65-6, Lithium bis(trifluoromethylsulfonyl)amide  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte; nonaq. electrolyte solns.  
 contg. furan resins for Li batteries for suppressing self discharge)  
 RN 7791-03-9 HCPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



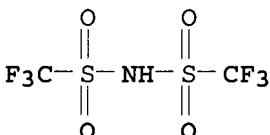
● Li

RN 33454-82-9 HCPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 90076-65-6 HCPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



● Li

IT 110-00-9D, Furan, derivs., polymers

RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte solns. contg. furan resins for Li batteries for suppressing self discharge)

RN 110-00-9 HCAPLUS

CN Furan (7CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium battery electrolyte furan resin  
 IT **Battery electrolytes**  
 (nonaq. electrolyte solns. contg. furan resins for Li batteries for suppressing self discharge)  
 IT 7439-93-2, Lithium, uses  
 RL: DEV (Device component use); USES (Uses)  
 (anode; nonaq. electrolyte solns. contg. furan resins for Li batteries for suppressing self discharge)  
 IT 7791-03-9, Lithium perchlorate 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium trifluoromethanesulfonate 90076-65-6, Lithium bis(trifluoromethylsulfonyl)amide  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte; nonaq. electrolyte solns.  
 contg. furan resins for Li batteries for suppressing self discharge)  
 IT 110-00-9D, Furan, derivs., polymers 25212-86-6, Furfuryl alcohol homopolymer 25896-95-1, Acetone-furfural copolymer 26338-61-4, Furfural-phenol copolymer  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte solns. contg. furan resins for Li batteries for suppressing self discharge)  
 IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 109-99-9, Tetrahydrofuran, uses 110-71-4, 1,2-Dimethoxyethane 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 646-06-0, 1,3-Dioxolan 872-36-6, Vinylene carbonate 4437-85-8, Butylene carbonate  
 RL: DEV (Device component use); USES (Uses)  
 (solvent; nonaq. electrolyte solns. contg. furan resins for Li batteries for suppressing self discharge)

L117 ANSWER 17 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1995:608855 HCAPLUS

DOCUMENT NUMBER: 123:37139

TITLE: Characterization of the lithium-organic electrolyte interface containing inorganic and organic additives by in situ techniques

AUTHOR(S): Matsuda, Yoshiharu; Ishikawa, Masashi; Yoshitake, Shinsuke; Morita, Masayuki

CORPORATE SOURCE: Department of Applied Chemistry and Chemical Engineering, Faculty of Engineering, Yamaguchi University, Tokiwadai, Ube, 755, Japan

SOURCE: **Journal of Power Sources (1995),**  
**54 (2), 301-5**  
**CODEN: JPSODZ; ISSN: 0378-7753**

PUBLISHER: **Elsevier**  
 DOCUMENT TYPE: **Journal**  
 LANGUAGE: **English**

AB **SnI<sub>2</sub> and AlI<sub>3</sub> additives improved charge/discharge cycling efficiency of a Li electrode in propylene carbonate **electrolyte** contg. LiClO<sub>4</sub>. The combination of different types of additive, i.e., the addn. of AlI<sub>3</sub> together with 2-methylfuran to the **electrolyte**, resulted in an excellent cycling efficiency of the Li electrode. The electrochem. behavior of an Li electrode-org. **electrolyte** interface was investigated by in-situ techniques, e.g., a.c. impedance measurements and scanning vibrating electrode technique. The relation between the Li rechargeability and the interfacial behavior of the Li electrode in the org. **electrolyte** in the absence and the presence of the additives was discussed.**

IT **7439-93-2, Lithium, uses**

RL: TEM (Technical or engineered material use); USES (Uses)  
 (characterization of lithium electrode-org. **electrolyte** interface contg. inorg. and org. additives by in-situ techniques)

RN **7439-93-2 HCPLUS**

CN **Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)**

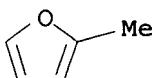
Li

IT **534-22-5, 2-Methylfuran**

RL: MOA (Modifier or additive use); USES (Uses)  
 (**electrolyte** contg.; characterization of lithium electrode-org. **electrolyte** interface contg. inorg. and org. additives by in-situ techniques)

RN **534-22-5 HCPLUS**

CN **Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)**

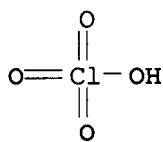


IT **7791-03-9, Lithium perchlorate**

RL: TEM (Technical or engineered material use); USES (Uses)  
 (**electrolyte** contg.; characterization of lithium electrode-org. **electrolyte** interface contg. inorg. and org. additives by in-situ techniques)

RN **7791-03-9 HCPLUS**

CN **Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)**



## ● Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 72

ST lithium electrode **electrolyte** interface characterization;  
 tin iodide additive **electrolyte** electrode interface;  
 aluminum iodide additive **electrolyte** electrode interface;  
 methylfuran additive **electrolyte** electrode interface;  
**battery** lithium electrode **electrolyte** interface

IT Interface  
 (electrode-**electrolyte**, characterization of lithium  
 electrode-org. **electrolyte** interface contg. inorg. and  
 org. additives by in-situ techniques)

IT 7439-93-2, Lithium, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (characterization of lithium electrode-org. **electrolyte**  
 interface contg. inorg. and org. additives by in-situ techniques)

IT 534-22-5, 2-Methylfuran 7550-35-8, Lithium bromide  
 7784-23-8, Aluminum iodide (AlI<sub>3</sub>) 10294-70-9, Tin iodide (SnI<sub>2</sub>)  
 10377-51-2, Lithium iodide  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (**electrolyte** contg.; characterization of lithium  
 electrode-org. **electrolyte** interface contg. inorg. and  
 org. additives by in-situ techniques)

IT 108-32-7, Propylene carbonate 7791-03-9, Lithium  
 perchlorate  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (**electrolyte** contg.; characterization of lithium  
 electrode-org. **electrolyte** interface contg. inorg. and  
 org. additives by in-situ techniques)

L117 ANSWER 18 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1994:413815 HCAPLUS  
 DOCUMENT NUMBER: 121:13815  
 TITLE: Fluorinated surfactants as additives for lithium  
 batteries  
 AUTHOR(S): Lemordant, D.; Ribes, A. Tudela; Willmann, P.  
 CORPORATE SOURCE: Lab. Energ. et React. aux Interfaces, Univ. P.  
 et M. Curie, Paris, 75005, Fr.  
 SOURCE: Power Sources (1993), 14, 69-80  
 CODEN: POSOAN; ISSN: 0743-7137

DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB The effects of a fluorinated surface active agent tetraethylammonium  
 perfluorooctylsulfonate (TEAFOS) on the cycling efficiencies of the  
 Li electrode in propylene carbonate (PC)/LiClO<sub>4</sub> **electrolyte**  
 were studied. Cycling Li on an inert support shows very low  
 efficiency in the absence of any additive. Addn. of org. additives  
 like benzene or 2-methylthiophene to the **electrolyte** soln.  
 improved the coulombic efficiency of Li during deposition/dissoln.

cycles. TEAFOS appears to be a very efficient additive as the quantity (in moles) of surfactant required to obtain the same improvement as benzene, for example, is at least one order of magnitude lower. Organo salts like Li perfluorooctane sulfonate or TEAFOS are sol. in PC and cond. data show that they behave as fully dissociated salts in highly polar org. solvents like PC. Surprisingly, the variations of the surface tension at the PC/air interface or the contact angle (on glass plates) are apparent only for concn. >0.01 mol/L. In connection with this result, it was found that the efficiency increases with surfactant concn. from 0.01 mol/L up to the concn. of  $\approx$ 0.05 mol/L at satn. at room temp. Addn. of 5% of benzene to the electrolyte contg. 0.02 mol/L of TEAFOS lead to a further improvement of the cycling efficiency. The mechanism of action of these lipophilic compds. is similar and related to adsorption at interface.

IT 7439-93-2, Lithium, uses

RL: USES (Uses)  
(anodes, cycling efficiency of, in batteries, effect of fluorinated surfactants in electrolyte on)

RN 7439-93-2 HCPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

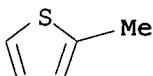
Li

IT 554-14-3, 2-Methylthiophene

RL: USES (Uses)  
(electrolyte contg., lithium perchlorate, fluorinated surfactants in, for lithium anode cycling efficiency, in batteries)

RN 554-14-3 HCPLUS

CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)

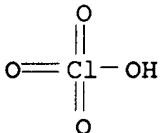


IT 7791-03-9, Lithium perchlorate

RL: USES (Uses)  
(electrolyte, contg. fluorinated surfactants for lithium anode cycling efficiency, in batteries)

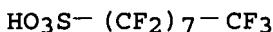
RN 7791-03-9 HCPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 29457-72-5  
 RL: USES (Uses)  
 (surfactant, **electrolyte** contg., lithium perchlorate,  
 for lithium anode cycling efficiency, in **batteries**)  
 RN 29457-72-5 HCAPLUS  
 CN 1-Octanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8-  
 heptadecafluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST fluorinated surfactant lithium **battery** performance;  
 ethylammonium perfluorooctylsulfonate surfactant lithium  
**battery** performance; benzene additive **electrolyte**  
 lithium **battery**; methylthiophene additive  
**electrolyte** lithium **battery**  
 IT **Battery electrolytes**  
 (lithium perchlorate, contg. fluorinated surfactants, for lithium  
 anode cycling efficiency, in **batteries**)  
 IT Anodes  
 (**battery**, lithium, cycling efficiency of, effect of  
 fluorinated surfactants in **electrolyte** on)  
 IT 7439-93-2, Lithium, uses  
 RL: USES (Uses)  
 (anodes, cycling efficiency of, in **batteries**, effect of  
 fluorinated surfactants in **electrolyte** on)  
 IT 71-43-2, Benzene, uses 108-32-7, Propylene carbonate  
 554-14-3, 2-Methylthiophene  
 RL: USES (Uses)  
 (**electrolyte** contg., lithium perchlorate, fluorinated  
 surfactants in, for lithium anode cycling efficiency, in  
**batteries**)  
 IT 7791-03-9, Lithium perchlorate  
 RL: USES (Uses)  
 (**electrolyte**, contg. fluorinated surfactants for  
 lithium anode cycling efficiency, in **batteries**)  
 IT 29457-72-5 56773-42-3, Tetraethylammonium  
 perfluorooctylsulfonate 59587-38-1  
 RL: USES (Uses)  
 (surfactant, **electrolyte** contg., lithium perchlorate,  
 for lithium anode cycling efficiency, in **batteries**)

L117 ANSWER 19 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1994:195809 HCAPLUS  
 DOCUMENT NUMBER: 120:195809  
 TITLE: DSC studies pertaining to safety related  
 chemistry of **secondary** Li  
 cells  
 AUTHOR(S): Pasquariello, D. M.; Abraham, K. M.; Willstaedt,  
 E. B.; Shen, D. H.; Surampudi, S.  
 CORPORATE SOURCE: EIC Laboratories Inc., Norwood, MA, 02062, USA  
 SOURCE: Proceedings - Electrochemical Society (1993), (Proceeding of the Symposium on  
 Lithium Batteries, 1992), 106-25

CODEN: PESODO; ISSN: 0161-6374

DOCUMENT TYPE: Journal  
LANGUAGE: English

AB DSC was used to study the role of components on the safety of secondary Li/TiS<sub>2</sub> cells. Cyclic ether/LiAsF<sub>6</sub> electrolytes undergo strong exothermic reactions with fresh Li at temps. as low as 140° but cyclic esters do not react at <190°. DSC data from cycled anodes, show that exothermic reactions start at 50° when the electrolyte contains cyclic esters and at 100° when cyclic ethers. The difference in reactivity between fresh and cycled Li in the ester electrolyte is due to the properties of the passivation layer on the Li surface. DSC data of material removed from a cycled TiS<sub>2</sub> cathode suggests that TiS<sub>2</sub> catalyzes electrolyte decompn., but the reaction is not as exothermic as that of the anode. The reactions responsible for the exotherms at the anode and the cathode are important factors for the low heat tolerance of secondary Li cells.

IT 7439-93-2, Lithium, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction of, with cyclic ethers and esters in electrolyte, effect on safety and heat tolerance of battery)

RN 7439-93-2 HCPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

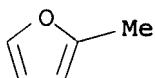
Li

IT 534-22-5, 2-Methyl furan

RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction of, with lithium, in electrolyte, effect on safety and heat tolerance of battery)

RN 534-22-5 HCPLUS

CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

ST safety lithium battery exothermic reaction; ester electrolyte reaction lithium anode

IT Battery electrolytes

(lithium salts contg. cyclic ethers and cyclic ester solvents, exothermic reaction of lithium with)

IT Safety

(of lithium batteries, role of exothermic reaction of anode with cyclic ethers and esters on)

IT Reaction

(exothermic, of lithium with cyclic ethers and esters, effect of, on safety of lithium battery)

IT 29935-35-1, Lithium hexafluoroarsenate (LiAsF<sub>6</sub>)

RL: USES (Uses)

(electrolyte contg. cyclic ethers or esters and, lithium reaction in)

IT 66594-52-3, Aluminum 20, lithium 80 68968-16-1 77088-52-9,  
 Aluminum 15, lithium 85 142241-67-6  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (reaction of, with cyclic ethers and esters in  
 electrolyte)

IT 7439-93-2, Lithium, reactions 12039-13-3, Titanium sulfide  
 (TiS<sub>2</sub>)  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (reaction of, with cyclic ethers and esters in  
 electrolyte, effect on safety and heat tolerance of  
 battery)

IT 96-47-9, 2-Methyl tetrahydrofuran 96-49-1, Ethylene carbonate  
 108-32-7, Propylene carbonate 109-99-9, Tetrahydrofuran, reactions  
 112-49-2, Triglyme 534-22-5, 2-Methyl furan 646-06-0,  
 Dioxolane  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (reaction of, with lithium, in electrolyte, effect on  
 safety and heat tolerance of battery)

L117 ANSWER 20 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1994:195807 HCAPLUS  
 DOCUMENT NUMBER: 120:195807  
 TITLE: Li/LixCoO<sub>2</sub> rechargeable cell:  
 influence of electrolyte composition  
 and additives on performance  
 AUTHOR(S): Peled, E.; Menachem, C.; Gorenstein, A.; Alkon, A.  
 CORPORATE SOURCE: Sch. Chem., Tel Aviv Univ., Tel Aviv, 69978,  
 Israel  
 SOURCE: Proceedings - Electrochemical Society (1993), 93-24 (Proceeding of the Symposium on Lithium Batteries, 1992), 68-74  
 CODEN: PESODO; ISSN: 0161-6374

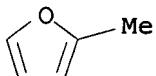
DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB The compatibility of Li anode and LiCoO<sub>2</sub> intercalation cathode with 4 2-Me-furan (I) electrolytes were studied. The electrolytes were LiAsF<sub>6</sub> in I, LiAsF<sub>6</sub> and LiBF<sub>4</sub> in I, LiAsF<sub>6</sub> in I/ di-Me-carbonate (II), and LiAsF<sub>6</sub> and LiBF<sub>4</sub> in I/II. The II-free electrolytes showed poor compatibility with Li. The electrolyte contg. LiBF<sub>4</sub> exhibited the best compatibility with Li but the poorest compatibility with the LiCoO<sub>2</sub> cathode. Modified cathodes were prep'd. by backing CoCO<sub>3</sub>, Li<sub>2</sub>CO<sub>3</sub>, and CaCO<sub>3</sub> mixt. with a Li:Ca ratio of 1.0:0.6, at 900°; Ca was present as CaO in the final cathode mix. The presence of CaO seems to aid in using the electrolyte with LiAsF<sub>6</sub>/LiBF<sub>4</sub> in I/II which has the best compatibility with Li. The CaO additive led to enhanced current efficiency and cathode utilization and slowed down the degrdn. rate of cathode materials.

IT 7439-93-2, Lithium, uses  
 RL: USES (Uses)  
 (anodes, compatibility of electrolyte of  
 lithium salts with 2-Me-furan and  
 di-Me-carbonate with)

RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 534-22-5, 2-Methyl-furan  
 RL: USES (Uses)  
 (electrolyte contg., lithium anode compatibility with)  
 RN 534-22-5 HCAPLUS  
 CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 72  
 ST methylfuran electrolyte lithium intercalation  
 battery; calcium oxide additive intercalation cathode;  
 cobalt lithium oxide intercalation cathode  
 IT **Battery electrolytes**  
 (lithium salts with 2-Me-furan and  
 di-Me-carbonate, anode compatibility with)  
 IT Cathodes  
 (battery, cobalt lithium oxide, lithium-intercalating,  
 additive for stabilization of)  
 IT Anodes  
 (battery, lithium, compatibility of electrolyte  
 of lithium salts with 2-Me-furan and  
 di-Me-carbonate with)  
 IT 7439-93-2, Lithium, uses  
 RL: USES (Uses)  
 (anodes, compatibility of electrolyte of  
 lithium salts with 2-Me-furan and  
 di-Me-carbonate with)  
 IT 534-22-5, 2-Methyl-furan 616-38-6, Dimethyl-carbonate  
 14283-07-9, Lithium fluoroborate (LiBF<sub>4</sub>) 29935-35-1, Lithium  
 hexafluoroarsenate (LiAsF<sub>6</sub>)  
 RL: USES (Uses)  
 (electrolyte contg., lithium anode compatibility with)

L117 ANSWER 21 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 1993:584681 HCAPLUS  
 DOCUMENT NUMBER: 119:184681  
 TITLE: Behavior of lithium/electrolyte  
 interface in organic solutions  
 AUTHOR(S): Matsuda, Yoshiharu  
 CORPORATE SOURCE: Fac. Eng., Yamaguchi Univ., Ube, 755, Japan  
 SOURCE: Journal of Power Sources (1993),  
 43(1-3), 1-7  
 CODEN: JPSODZ; ISSN: 0378-7753

DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB The coulombic efficiency of a Li anode in Li salt  
 -org. solvent electrolytes was improved by addn. of Mg<sup>2+</sup>,  
 Zn<sup>2+</sup>, In<sup>3+</sup>, Ga<sup>3+</sup>, etc. Some org. additives, e.g.,  
 2-methylthiophene, 2-methylfuran, benzene, etc., also improved the  
 coulombic efficiency of Li anodes during cycling. The mechanisms of  
 these additives are discussed in connection with the structure of  
 the electrode/electrolyte interface.  
 IT 7439-93-2, Lithium, uses  
 RL: USES (Uses)

(anodes, interface of org. **electrolyte** with, effect of additives on)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

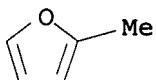
IT 534-22-5, 2-Methyl furan 554-14-3, 2-Methyl thiophene

RL: USES (Uses)

(electrolyte contg. org. solvent and lithium salt and, lithium anode coulombic efficiency in)

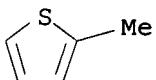
RN 534-22-5 HCAPLUS

CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



RN 554-14-3 HCAPLUS

CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



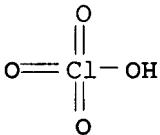
IT 7791-03-9, Lithium perchlorate (LiClO4)

RL: USES (Uses)

(electrolyte contg. org. solvent and, lithium anode interface with, effect of additives on)

RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 72

ST lithium anode interface **electrolyte** additive;  
**battery** lithium anode **electrolyte** interface

IT **Battery electrolytes**  
(lithium salt-org. solvent, with inorg. and org. additives, lithium anode interface with)

IT Electric resistance

- (of lithium anode/org. solvent **electrolyte**, effect of additives on)
- IT Anodes
  - (battery, lithium, interface with additive-contg. lithium salt-org. solvent **electrolyte**, properties of)
- IT Interface
  - (electrode-electrolyte, lithium anode/org. solvent, effect of additives on)
- IT 7439-93-2, Lithium, uses
  - RL: USES (Uses)
    - (anodes, interface of org. **electrolyte** with, effect of additives on)
- IT 108-32-7, Propylene carbonate
  - RL: USES (Uses)
    - (electrolyte contg. lithium perchlorate and, lithium anode interface with, effect of additives on)
- IT 71-43-2, Benzene, uses 534-22-5, 2-Methyl furan
  - 554-14-3, 2-Methyl thiophene 7429-90-5, Aluminum, uses
  - 7439-95-4, Magnesium, uses 7440-31-5, Tin, uses 7440-55-3, Gallium, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses
  - 7440-74-6, Indium, uses
  - RL: USES (Uses)
    - (electrolyte contg. org. solvent and lithium salt and, lithium anode coulombic efficiency in)
- IT 7791-03-9, Lithium perchlorate (LiClO<sub>4</sub>)
  - RL: USES (Uses)
    - (electrolyte contg. org. solvent and, lithium anode interface with, effect of additives on)

L117 ANSWER 22 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1993:563959 HCAPLUS  
 DOCUMENT NUMBER: 119:163959  
 TITLE: Electrochemical study of the passivating layer on lithium intercalated carbon electrodes in nonaqueous solvents  
 AUTHOR(S): Simon, B.; Boeuvre, J. P.; Brousse, M.  
 CORPORATE SOURCE: Alcatel Alsthom Recherche, Marcoussis, 91640, Fr.  
 SOURCE: Journal of Power Sources (1993), 43(1-3), 65-74  
 CODEN: JPSODZ; ISSN: 0378-7753

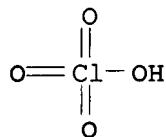
DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB Passivation of graphitized C electrodes was studied by impedance spectroscopy to det. the double layer capacitance and charge transfer characteristics of Li-intercalated C anodes. The graphitized C films were obtained from polyacrylonitrile. The reactions of **electrolyte** components during the intercalation cycles were studied to det. the origin of the passivating species. Solubilization of the passivating layer in the **electrolyte** appeared to be the main mechanism of self-discharge; several **electrolyte** additives were identified which were efficient for charge retention in button-type Li-C tissue batteries.

IT 7791-03-9, Lithium perchlorate (LiClO<sub>4</sub>) 33454-82-9

RL: USES (Uses)
 

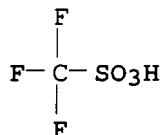
- (electrolyte contg., graphitized carbon anode passivation in)

RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 33454-82-9 HCAPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 25154-40-9, Methyl thiophene  
 RL: USES (Uses)  
 (electrolyte contg., lithium salt  
 -org. solvent, graphitized carbon anode passivation in)  
 RN 25154-40-9 HCAPLUS  
 CN Thiophene, methyl- (7CI, 8CI, 9CI) (CA INDEX NAME)



D1-Me

IT 7439-93-2, Lithium, reactions  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (intercalation of, in graphitized carbon anodes, passivating  
 layer formation during)  
 RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

ST lithium intercalation graphitized carbon anode; graphitized carbon anode passivation **electrolyte; battery**  
graphitized carbon anode

IT **Battery electrolytes**  
(lithium salt-org. solvent, graphitized  
carbon anode passivation in, additives for minimization of)

IT **Passivation**  
(of graphitized carbon anodes during lithium intercalation,  
**electrolyte role in**)

IT **Reduction, electrochemical**  
(of lithium salt-org. solvent  
**electrolytes**, in cycling of lithium-intercalating carbon)

IT **Anodes**  
(**battery**, graphitized carbon, lithium-intercalating,  
stability of)

IT 7782-42-5P, Graphite, uses  
RL: PREP (Preparation); USES (Uses)  
(anodes, lithium-intercalating, passivating layer on, formation  
and properties of, for **batteries**)

IT 75-18-3 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene  
carbonate 108-32-7, Propylene carbonate 109-99-9, THF, uses  
110-71-4, 1,2-Dimethoxyethane 7791-03-9, Lithium  
perchlorate (LiClO<sub>4</sub>) 29935-35-1, Lithium hexafluoroarsenate  
(LiAsF<sub>6</sub>) 33454-82-9  
RL: USES (Uses)  
(**electrolyte** contg., graphitized carbon anode  
passivation in)

IT 124-38-9, Carbon dioxide, uses 306-94-5, Perfluorodecalin  
624-91-9, Methyl nitrite 1120-71-4, Propane sultone  
25154-40-9, Methyl thiophene  
RL: USES (Uses)  
(**electrolyte** contg., lithium salt  
-org. solvent, graphitized carbon anode passivation in)

IT 7440-44-0P, Carbon, uses  
RL: PREP (Preparation); USES (Uses)  
(graphitized, anodes, lithium-intercalating, passivating layer  
on, formation and properties of, for **batteries**)

IT 7439-93-2, Lithium, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(intercalation of, in graphitized carbon anodes, passivating  
layer formation during)

L117 ANSWER 23 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1993:542922 HCAPLUS  
DOCUMENT NUMBER: 119:142922  
TITLE: Lithium insertion into titanium sulfide (TiS<sub>2</sub>)  
from various **electrolytes**  
AUTHOR(S): Skundin, A. M.; Stefanovskaya, E. E.; Egorkina,  
O. Yu.  
CORPORATE SOURCE: A. N. Frumkin Inst. Electrochem., Moscow,  
117071, Russia  
SOURCE: Journal of Power Sources (1993),  
43(1-3), 301-6  
CODEN: JPSODZ; ISSN: 0378-7753  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB The quasi-equil. behavior of TiS<sub>2</sub> cathodes in various  
**electrolytes** was studied, and the galvanostatic switch-on  
transients in these **electrolytes** were measured. The

electrolytes used were: 1M LiCl4 in propylene carbonate and in  $\gamma$ -butyrolactone (BL), 1M LiBF4 in BL, and 1M LiAsF6 in a mixt. of 2-methyltetrahydrofuran and 2-methylfuran. Both the potential of the intercalate LixTiS2 with fixed x values and the diffusivity of the intercalating species are dependent on the nature of the electrolyte.

IT 534-22-5, 2-Methylfuran

RL: USES (Uses)

(electrolyte contg., lithium hexafluoroarsenate, lithium intercalation in titanium sulfide cathodes during battery discharge in relation to)

RN 534-22-5 HCAPLUS

CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



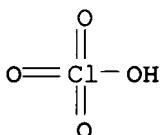
IT 7791-03-9, Lithium perchlorate

RL: USES (Uses)

(electrolyte, lithium intercalation in titanium sulfide cathodes during battery discharge in relation to)

RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 7439-93-2, Lithium, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(intercalation of, in titanium disulfide cathodes during battery discharge, electrolyte effect on)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 72

ST lithium intercalation titanium sulfide cathode electrolyte ; battery lithium intercalation titanium sulfide cathode

IT Battery electrolytes

(lithium intercalation in titanium sulfide cathodes during discharge in relation to)

IT Cathodes

(battery, titanium sulfide, performance of, electrolyte effect on)

IT Inclusion reaction  
(intercalation, electrochem., of lithium, in titanium disulfide cathodes during **battery** discharge, **electrolyte** effect on)

IT 12039-13-3, Titanium sulfide (TiS2)  
RL: USES (Uses)  
(cathodes, performance of, **electrolyte** effect on)

IT 96-47-9, 2-Methyltetrahydrofuran 534-22-5, 2-Methylfuran  
RL: USES (Uses)  
(**electrolyte** contg., lithium hexafluoroarsenate, lithium intercalation in titanium sulfide cathodes during **battery** discharge in relation to)

IT 96-48-0,  $\gamma$ -Butyrolactone  
RL: USES (Uses)  
(**electrolyte** contg., lithium intercalation in titanium sulfide cathodes during **battery** discharge in relation to)

IT 108-32-7, Propylene carbonate  
RL: USES (Uses)  
(**electrolyte** contg., lithium perchlorate, lithium intercalation in titanium sulfide cathodes during **battery** discharge in relation to)

IT 7791-03-9, Lithium perchlorate 14283-07-9, Lithium tetrafluoroborate (LiBF4) 29935-35-1, Lithium hexafluoroarsenate (LiAsF6)  
RL: USES (Uses)  
(**electrolyte**, lithium intercalation in titanium sulfide cathodes during **battery** discharge in relation to)

IT 7439-93-2, Lithium, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(intercalation of, in titanium disulfide cathodes during **battery** discharge, **electrolyte** effect on)

L117 ANSWER 24 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1992:637171 HCAPLUS  
 DOCUMENT NUMBER: 117:237171  
 TITLE: Secondary lithium **batteries**  
 INVENTOR(S): Sugeno, Naoyuki; Anzai, Masanori; Nagaura, Toru  
 PATENT ASSIGNEE(S): Sony Corp., Japan  
 SOURCE: Eur. Pat. Appl., 18 pp.  
 CODEN: EPXXDW  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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EP 486950	A1	19920527	EP 1991-119471	199111 14
			<--	
EP 486950 R: DE, FR, GB	B1	19940810		
JP 04184872	A2	19920701	JP 1990-312481	199011 17
			<--	
JP 3089662	B2	20000918		

JP 2000268864	A2	20000929	JP 2000-65779	199011 17
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JP 3356157	B2	20021209		
JP 04280082	A2	19921006	JP 1991-67998	199103 07
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JP 3079613	B2	20000821		
CA 2055305	AA	19920518	CA 1991-2055305	199111 12
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CA 2055305	C	20020219		
US 5292601	A	19940308	US 1991-792628	199111 15
<--				
PRIORITY APPLN. INFO.:			JP 1990-312481	A
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			JP 1991-67998	A
<--				
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AB The batteries have Li-intercalatable carbonaceous anodes,  $\text{Li}_x\text{MO}_2$  cathodes ( $x = 0.5-1$ , M = Co, Ni, and/or Mn), and electrolyte contg. a mixed solvent of 15-75 vol.% propylene carbonate and di-Et and/or di-Pr carbonate. The carbonaceous material is obtained from furan resins and petroleum pitches and has a spacing of (002) planes of  $\geq 3.70 \text{ \AA}$  and any DTA exothermic peak at  $\geq 700^\circ$ . The carbonaceous material further comprises 0.2-5.0 wt.% P and 0.2-2.0 wt.% B.

IT 110-00-9D, Furan, derivs., polymers

RL: USES (Uses)

(carbonaceous materials from, for lithium-intercalating anodes, in batteries)

RN 110-00-9 HCPLUS

CN Furan (7CI, 8CI, 9CI) (CA INDEX NAME)



IT 7439-93-2, Lithium, uses

RL: USES (Uses)

(carbonaceous materials intercalated with, anodes, for batteries)

RN 7439-93-2 HCPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IC ICM H01M010-40

ICS H01M004-58  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium intercalating carbonaceous anode **battery**; nickel  
 lithium oxide **battery** cathode; cobalt lithium oxide  
**battery** cathode; manganese lithium oxide **battery**  
 cathode; phosphorus carbonaceous material lithium anode; boron  
 carbonaceous material lithium anode; diethyl carbonate  
**battery** electrolyte solvent; dipropyl carbonate  
**battery** electrolyte solvent; propylene carbonate  
**battery** electrolyte solvent  
 IT **Battery electrolytes**  
 (lithium salts, solvent mixts. for)  
 IT **Batteries, secondary**  
 (lithium, performance of)  
 IT Carbonaceous materials  
 RL: USES (Uses)  
 (lithium-intercalated, anodes, for **batteries**)  
 IT Cathodes  
 (**battery**, lithium transition metal oxide)  
 IT Anodes  
 (**battery**, lithium-intercalated carbonaceous materials  
 for)  
 IT Pitch  
 (petroleum, lithium-intercalated, anodes, for **batteries**)  
 )  
 IT 110-00-9D, Furan, derivs., polymers  
 RL: USES (Uses)  
 (carbonaceous materials from, for lithium-intercalating anodes,  
 in **batteries**)  
 IT 7439-93-2, Lithium, uses  
 RL: USES (Uses)  
 (carbonaceous materials intercalated with, anodes, for  
**batteries**)  
 IT 12031-65-1, Lithium nickel oxide (LiNiO<sub>2</sub>) 12057-17-9, Lithium  
 manganese oxide (LiMn<sub>2</sub>O<sub>4</sub>) 12190-79-3, Cobalt lithium oxide  
 (CoLiO<sub>2</sub>) 56369-20-1, M = Co 123193-61-3, Cobalt lithium oxide  
 (CoLi<sub>0.5</sub>-1O<sub>2</sub>) 123550-86-7, Lithium manganese oxide (Li<sub>0.5</sub>-1MnO<sub>2</sub>)  
 144566-63-2, Lithium nickel oxide (Li<sub>0.5</sub>-1NiO<sub>2</sub>)  
 RL: DEV (Device component use); USES (Uses)  
 (cathodes, for secondary lithium **batteries**)  
 IT 105-58-8, Diethyl carbonate 623-96-1, Dipropyl carbonate  
 RL: USES (Uses)  
 (electrolyte solvent contg., propylene carbonate, for  
 lithium **batteries**)  
 IT 108-32-7, Propylene carbonate  
 RL: USES (Uses)  
 (electrolyte solvent, contg. di-Et and/or di-Pr  
 carbonate lithium **batteries**)  
 IT 7440-42-8, Boron, uses 7723-14-0, Phosphorus, uses  
 RL: USES (Uses)  
 (lithium-intercalated carbonaceous anodes contg., for secondary  
**batteries**)

L117 ANSWER 25 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1992:161080 HCAPLUS

DOCUMENT NUMBER: 116:161080

TITLE: Properties of electrochemically synthesized  
 polymer electrodes. Part VIII. Kinetics of  
 polypyrrole in polymer **electrolyte**  
**cells**

AUTHOR(S) : Casagrande, C.; Panero, S.; Prosperi, P.; Scrosati, B.

CORPORATE SOURCE: Dip. Chim., Univ. Roma 'La Sapienza', Rome, 00185, Italy

SOURCE: Journal of Applied Electrochemistry (1992), 22(3), 195-9

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Results obtained by cyclic voltammetry and frequency response anal. show that the electrochem. behavior of solid state cells based on the combination of polymer **electrolytes** and polymer cathodes is crucially affected by the morphol. of the electrode interfaces. Fast kinetics and good interfacial contacts can be obtained using composite electrodes electrosynthesized from solns. contg. a polymer **electrolyte** and large surfactant anions.

IT 7439-93-2D, Lithium, polyethylene complex  
 RL: PRP (Properties)  
 (electrochem. polymn. of pyrrole in acetonitrile contg. lithium perchlorate and)

RN 7439-93-2 HCAPLUS

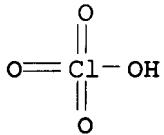
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 7791-03-9, Lithium perchlorate  
 RL: PRP (Properties)  
 (electrochem. polymn. of pyrrole in acetonitrile contg., with or without polyethylene oxide and sodium dodecyl sulfate)

RN 7791-03-9 HCAPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 109-97-7, Pyrrole  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (polymn. of, electrochem., with polyethylene oxide and sodium dodecyl sulfate)

RN 109-97-7 HCAPLUS

CN 1H-Pyrrole (9CI) (CA INDEX NAME)



CC 72-2 (Electrochemistry)  
 Section cross-reference(s): 36, 52  
 ST polypyrrole redox polymer **electrolyte cell**;  
 polyethylene oxide sodium dodecyl sulfate **electrolyte**;  
 elec impedance polypyrrole cell  
 IT 7439-93-2D, Lithium, polyethylene complex 25322-68-3,  
 Polyethylene oxide 25322-68-3D, Polyethylene oxide, lithium  
 complex  
 RL: PRP (Properties)  
 (electrochem. polymn. of pyrrole in acetonitrile contg. lithium  
 perchlorate and)  
 IT 7791-03-9, Lithium perchlorate  
 RL: PRP (Properties)  
 (electrochem. polymn. of pyrrole in acetonitrile contg., with or  
 without polyethylene oxide and sodium dodecyl sulfate)  
 IT 109-97-7, Pyrrole  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (polymn. of, electrochem., with polyethylene oxide and sodium  
 dodecyl sulfate)

L117 ANSWER 26 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1991:563107 HCAPLUS  
 DOCUMENT NUMBER: 115:163107  
 TITLE: Mixed-solvent **electrolytes** for  
 ambient-temperature secondary lithium  
**batteries**  
 INVENTOR(S): Shen, David H.; Surampudi, Subbarao;  
 Deligiannis, Fotios; Halpert, Gerald  
 PATENT ASSIGNEE(S): California Institute of Technology, USA  
 SOURCE: U.S., 11 pp.  
 CODEN: USXXAM  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 5030528	A	19910709	US 1990-520265	199005 07

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 PRIORITY APPLN. INFO.: US 1990-520265  
 199005  
07

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AB The **electrolytes** comprise a solvent of a mixt. of ethylene  
 carbonate .apprx.5-30 vol.%, EPDM rubber .apprx.0.01-0.1 wt.%,  
 2-methylfuran .apprx.0.2-2 vol.%, and balance 2-  
 methyltetrahydrofuran and a conductive Li salt  
 (esp. 1.0-1.8M LiAsF<sub>6</sub>) solute. The **electrolyte** has a high  
 cond. and is less corrosive to Li and Li alloy anodes. The cathode  
 is a mixt. of EPDM rubber and a compd. selected from TiS<sub>2</sub>, NbSe<sub>3</sub>,  
 V<sub>6</sub>O<sub>13</sub>, V<sub>2</sub>O<sub>5</sub>, MoS<sub>2</sub>, MoS<sub>3</sub>, CoO<sub>2</sub>, and CrO<sub>2</sub>.

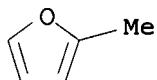
IT 7439-93-2, Lithium, uses and miscellaneous  
 RL: USES (Uses)  
 (anodes, in **batteries** with **electrolytes**  
 contg. mixed org. solvents)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 534-22-5, 2-Methylfuran  
 RL: USES (Uses)  
 (electrolyte contg., for secondary lithium  
 batteries)  
 RN 534-22-5 HCPLUS  
 CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M006-16  
 INCL 429197000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST battery lithium nonaq electrolyte solvent; furan  
 methyl lithium battery electrolyte; THF methyl  
 lithium battery electrolyte; EPDM rubber lithium  
 battery electrolyte; ethylene carbonate lithium  
 battery electrolyte  
 IT Batteries, secondary  
 (lithium, high-performance, with electrolytes contg.  
 mixed org. solvents)  
 IT Rubber, synthetic  
 RL: USES (Uses)  
 (EPDM, electrolyte contg., nonaq., for secondary  
 lithium batteries)  
 IT 7439-93-2, Lithium, uses and miscellaneous 12798-95-7  
 53680-59-4  
 RL: USES (Uses)  
 (anodes, in batteries with electrolytes  
 contg. mixed org. solvents)  
 IT 1314-62-1, Vanadium pentoxide, uses and miscellaneous 1317-33-5,  
 Molybdenum disulfide, uses and miscellaneous 12017-00-4, Cobalt  
 dioxide 12018-01-8, Chromium dioxide 12033-29-3, Molybdenum  
 trisulfide 12034-77-4, Niobium diselenide 12037-42-2, Vanadium  
 oxide (V6O13) 12039-13-3, Titanium disulfide  
 RL: USES (Uses)  
 (cathodes, contg. EPDM rubber, in batteries with  
 electrolytes contg. mixed org. solvents)  
 IT 96-47-9, 2-Methyltetrahydrofuran 96-49-1, Ethylene carbonate  
 534-22-5, 2-Methylfuran  
 RL: USES (Uses)  
 (electrolyte contg., for secondary lithium  
 batteries)  
 IT 74-85-1  
 RL: USES (Uses)  
 (rubber, EPDM, electrolyte contg., nonaq., for  
 secondary lithium batteries)

L117 ANSWER 27 OF 36 HCPLUS COPYRIGHT 2006 ACS on STN

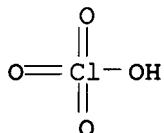
ACCESSION NUMBER: 1990:467305 HCPLUS

DOCUMENT NUMBER: 113:67305

TITLE: Performance of the low-current-density-synthesized polypyrrole in lithium cells containing propylene carbonate  
 AUTHOR(S): Novak, Petr; Vielstich, Wolf  
 CORPORATE SOURCE: Inst. Phys. Chem., Univ. Bonn, Bonn, D-5300/1, Germany  
 SOURCE: Journal of the Electrochemical Society (1990), 137(6), 1681-9  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB The properties of polypyrrole (PPy) films synthesized at very low c.ds. (1-250  $\mu$ A/cm<sup>2</sup>) were investigated. Potentiodynamic cycling, FTIR spectroscopy, and differential electrochem. mass spectroscopy were employed. The use of propylene carbonate (PC) based electrolytes for the synthesis results in an incorporation of PC fragments (arising by the electrooxidn. of PC) into the grown polypyrrole film. During subsequent cycling of PPy films in 0.5 M LiClO<sub>4</sub>/PC electrolyte, the electrochem. oxidn. of PC proceeds parallel with the doping/undoping process. The decrease in c.d. during polymer growth has the same effect as an addn. of small amts. of water into the electrolyte for synthesis - the performance of the polymer in secondary lithium cells is improved.  
 IT 7439-93-2, Lithium, uses and miscellaneous  
 RL: USES (Uses)  
     (battery, secondary, performance of low-current-d.-prepd. polypyrrole in)  
 RN 7439-93-2 HCPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

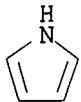
Li

IT 7791-03-9, Lithium perchlorate  
 RL: PRP (Properties)  
     (electrochem. polymn. of pyrrole in propylene carbonate contg.)  
 RN 7791-03-9 HCPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 109-97-7, Pyrrole  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
     (polymn. of, electrochem., on glassy carbon or gold or platinum in propylene carbonate contg. lithium perchlorate at low current densities, trace water effect on)  
 RN 109-97-7 HCPLUS  
 CN 1H-Pyrrole (9CI) (CA INDEX NAME)



CC 72-2 (Electrochemistry)  
 Section cross-reference(s): 35, 36, 52  
 ST polypyrrole electroprepn performance lithium **battery**;  
 propylene carbonate electrooxidn pyrrole polymn; water effect  
 pyrrole electropolymn  
 IT **Batteries, secondary**  
 (lithium-polypyrrole)  
 IT 7439-93-2, Lithium, uses and miscellaneous  
 RL: USES (Uses)  
 (battery, secondary, performance of  
 low-current-d.-prepd. polypyrrole in)  
 IT 7791-03-9, Lithium perchlorate  
 RL: PRP (Properties)  
 (electrochem. polymn. of pyrrole in propylene carbonate contg.)  
 IT 108-32-7, Propylene carbonate  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (oxidn. of, in electrochem. polymn. of pyrrole in propylene  
 carbonate contg. lithium perchlorate, lithium secondary  
 battery in relation to)  
 IT 109-97-7, Pyrrole  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (polymn. of, electrochem., on glassy carbon or gold or platinum  
 in propylene carbonate contg. lithium perchlorate at low current  
 densities, trace water effect on)

L117 ANSWER 28 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1990:142707 HCAPLUS  
 DOCUMENT NUMBER: 112:142707  
 TITLE: Effects of organic additives on the a.c.  
 impedance behavior at the lithium/  
 electrolyte solution interface  
 AUTHOR(S): Morita, M.; Aoki, S.; Matsuda, Y.  
 CORPORATE SOURCE: Fac. Eng., Yamaguchi Univ., Ube, 755, Japan  
 SOURCE: Progress in Batteries & Solar Cells (1989), 8, 98-101  
 DOCUMENT TYPE: Journal  
 CODEN: PBASDR; ISSN: 0198-7259  
 LANGUAGE: English

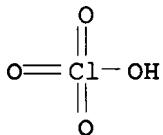
AB The effect of 2-methylfuran and 2-methylthiophene in propylene carbonate (I)-based **electrolytes** on the recharge capacity of Li anodes was investigated. The cycling efficiency of Li anodes in I/LiClO<sub>4</sub> was improved in presence of the additives. The a.c. impedance spectra of the Li anode/I-based **electrolyte** interface suggest that the efficiency enhancement was due to inhibition of film formation on the surface of the Li anode.

IT 7439-93-2, Lithium, properties  
 RL: PRP (Properties)  
 (anodes, cycling behavior of, in propylene carbonate-based  
 electrolyte contg. org. additives, for batteries  
 )

RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

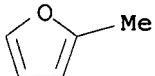
Li

IT 7791-03-9, Lithium perchlorate  
 RL: USES (Uses)  
 (electrolyte contg., lithium anode cycling in, org.  
 compd. additive effect on)  
 RN 7791-03-9 HCPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

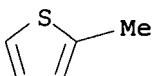


● Li

IT 534-22-5, 2-Methylfuran 554-14-3,  
 2-Methylthiophene  
 RL: USES (Uses)  
 (electrolyte contg., propylene carbonate-based, lithium  
 anode cycling in)  
 RN 534-22-5 HCPLUS  
 CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



RN 554-14-3 HCPLUS  
 CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 76  
 ST anode lithium org electrolyte interface; methylfuran  
 electrolyte additive lithium anode; methylthiophene  
 electrolyte additive lithium anode; battery  
 lithium anode capacity  
 IT Anodes  
 (battery, lithium, cycling of, in propylene  
 carbonate-based electrolyte contg. org. compd.  
 additive)  
 IT Electric impedance  
 (interfacial, of lithium anode/proylene carbonate-based  
 electrolyte, cyclic org. compd. additive effect on)

IT 7439-93-2, Lithium, properties  
 RL: PRP (Properties)  
 (anodes, cycling behavior of, in propylene carbonate-based  
 electrolyte contg. org. additives, for batteries  
 )

IT 108-32-7, Propylene carbonate 7791-03-9, Lithium  
 perchlorate 21324-40-3, Lithium hexafluorophosphate  
 RL: USES (Uses)  
 (electrolyte contg., lithium anode cycling in, org.  
 compd. additive effect on)

IT 534-22-5, 2-Methylfuran 554-14-3,  
 2-Methylthiophene  
 RL: USES (Uses)  
 (electrolyte contg., propylene carbonate-based, lithium  
 anode cycling in)

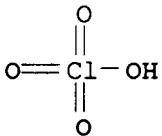
L117 ANSWER 29 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1989:582959 HCAPLUS  
 DOCUMENT NUMBER: 111:182959  
 TITLE: Effects of additives on the electrochemical  
 behavior at the lithium/organic  
 electrolyte interface  
 AUTHOR(S): Morita, Masayuki; Aoki, Seiki; Matsuda,  
 Yoshiharu  
 CORPORATE SOURCE: Fac. Eng., Yamaguchi Univ., Ube, 755, Japan  
 SOURCE: Denki Kagaku oyobi Kogyo Butsuri Kagaku (1989), 57(6), 523-6  
 CODEN: DKOKAZ; ISSN: 0366-9297  
 DOCUMENT TYPE: Journal  
 LANGUAGE: Japanese

AB Coulombic efficiency in the charge-discharge cycle of an Li  
 electrode was improved by the addn. of 2-methylfuran,  
 2-methylthiophene, or 4-methylthiazole to the propylene  
 carbonate/LiClO<sub>4</sub> electrolyte. The a.c. impedance at the  
 Li/org. electrolyte interface showed that the additive is  
 adsorbed on the Li surface to form a film which is responsible for  
 the enhancement of coulombic efficiency.

IT 7791-03-9, Lithium perchlorate  
 RL: PRP (Properties)  
 (battery electrolyte contg. with propylene  
 carbonate, electrochem. behavior of, methylfuran and  
 methylthiophene and methylthiazole effect on)

RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

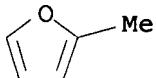


● Li

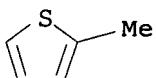
IT 534-22-5 554-14-3, 2-Methylthiophene  
 RL: PRP (Properties)  
 (coulombic efficiency in charge-discharge cycle of lithium

electrode in presence of)

RN 534-22-5 HCPLUS  
 CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



RN 554-14-3 HCPLUS  
 CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7439-93-2, Lithium, uses and miscellaneous  
 RL: USES (Uses)  
 (electrodes, coulombic efficiency of, in charge-discharge cycle,  
 methylfuran and methylthiophene and methylthiazole effects on)  
 RN 7439-93-2 HCPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

CC 72-2 (Electrochemistry)  
 Section cross-reference(s): 52, 66  
 ST lithium org electrolyte interface additive effect;  
 methylfuran effect coulombic efficiency lithium electrode;  
 methylthiophene effect coulombic efficiency lithium electrode;  
 methylthiazole effect coulombic efficiency lithium electrode  
 IT Electric impedance  
 (at interface of lithium and org. electrolyte,  
 adsorption of org. additives in relation to)  
 IT Batteries, secondary  
 (lithium, with org. electrolyte, effect of additives  
 on)  
 IT 7791-03-9, Lithium perchlorate  
 RL: PRP (Properties)  
 (battery electrolyte contg. with propylene  
 carbonate, electrochem. behavior of, methylfuran and  
 methylthiophene and methylthiazole effect on)  
 IT 108-32-7, Propylene carbonate  
 RL: PRP (Properties)  
 (battery electrolyte with, with lithium  
 perchlorate, methylfuran and methylthiophene and methylthiazole  
 effect on)  
 IT 534-22-5 554-14-3, 2-Methylthiophene 693-95-8,  
 4-Methylthiazole  
 RL: PRP (Properties)  
 (coulombic efficiency in charge-discharge cycle of lithium  
 electrode in presence of)  
 IT 7439-93-2, Lithium, uses and miscellaneous  
 RL: USES (Uses)  
 (electrodes, coulombic efficiency of, in charge-discharge cycle,

methylfuran and methylthiophene and methylthiazole effects on)

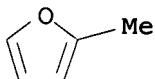
L117 ANSWER 30 OF 36 HCPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 1989:518141 HCPLUS  
 DOCUMENT NUMBER: 111:118141  
 TITLE: Behavior of the lithium electrode during cycling  
 in nonaqueous solutions  
 AUTHOR(S): Geronov, Yu.; Zlatilova, P.; Puresheva, B.;  
 Pasquali, M.; Pistoia, G.  
 CORPORATE SOURCE: Cent. Lab. Electrochem. Power Sources, Sofia,  
 1040, Bulg.  
 SOURCE: Journal of Power Sources (1989),  
 26(3-4), 585-91  
 CODEN: JPSODZ; ISSN: 0378-7753  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English

AB The highest efficiency of Li anode-limited batteries at a  
 c.d. of 4 mA/cm<sup>2</sup> and a charge d. of 2 mA-h/cm<sup>2</sup> was obtained when  
 LiAsF<sub>6</sub> in THF/2-methyltetrahydrofuran contg. 2 vol.% 2-methylfuran  
 was used as electrolyte. Neither the cell type (glass or  
 metal) nor the kind of cathode material (LiV<sub>3</sub>O<sub>8</sub> or LiCr<sub>0.9</sub>V<sub>0.1</sub>S<sub>2</sub>)  
 had any substantial effect on the efficiency. The changes of  
 polarization resistance, ohmic drop in the soln., and geometric  
 capacitance with cycling were investigated by a galvanostatic pulse  
 method. The method was used successfully to study the passivation  
 of the Li anode during cycling in the ether mixt.  
 electrolyte.

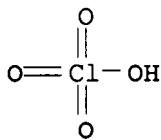
IT 7439-93-2, Lithium, properties  
 RL: PRP (Properties)  
 (anodes, behavior of, in cycling of battery with ether  
 mixt. electrolyte)  
 RN 7439-93-2 HCPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 534-22-5, 2-Methylfuran  
 RL: USES (Uses)  
 (electrolyte contg., lithium anode behavior in, in  
 cycling of battery)  
 RN 534-22-5 HCPLUS  
 CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



IT 7791-03-9, Lithium perchlorate  
 RL: USES (Uses)  
 (electrolyte, in propylene carbonate-ether mixt.,  
 lithium anode behavior in, in cycling of battery)  
 RN 7791-03-9 HCPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



## ● Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 72

ST lithium **battery** anode cycling behavior; ether mixt  
**electrolyte** lithium **battery**; passivation lithium  
 anode nonaq **battery**

IT **Electrolytic** polarization  
 (anodic-cathodic, of lithium, in cycling of **battery**  
 with ether mixt. **electrolyte**)

IT Anodes  
 (**battery**, lithium, cycling behavior of, in ether mixt.  
**electrolyte**)

IT Passivation  
 (electrochem., of lithium anodes, in cycling of **battery**  
 with ether mixt. **electrolyte**)

IT 7439-93-2, Lithium, properties  
 RL: PRP (Properties)  
 (anodes, behavior of, in cycling of **battery** with ether  
 mixt. **electrolyte**)

IT 96-47-9, 2-Methyltetrahydrofuran 96-49-1, Ethylene carbonate  
 108-32-7, Propylene carbonate 109-99-9, Thf, properties  
 110-71-4, Dimethoxyethane 534-22-5, 2-Methylfuran  
 RL: USES (Uses)  
 (**electrolyte** contg., lithium anode behavior in, in  
 cycling of **battery**)

IT 29935-35-1, Lithium hexafluoroarsenate  
 RL: USES (Uses)  
 (**electrolyte**, in ether mixt., lithium anode behavior  
 in, in **battery** cycling)

IT 7791-03-9, Lithium perchlorate  
 RL: USES (Uses)  
 (**electrolyte**, in propylene carbonate-ether mixt.,  
 lithium anode behavior in, in cycling of **battery**)

L117 ANSWER 31 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1989:518140 HCAPLUS  
 DOCUMENT NUMBER: 111:118140  
 TITLE: Organic additives for the **electrolytes**  
 of rechargeable lithium **batteries**  
 AUTHOR(S): Matsuda, Yoshiharu; Morita, Masayuki  
 CORPORATE SOURCE: Fac. Eng., Yamaguchi Univ., Ube, 755, Japan  
 SOURCE: Journal of Power Sources (1989),  
 26(3-4), 579-83  
 CODEN: JPSODZ; ISSN: 0378-7753  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB The effects of some org. additives contg. hetero-atoms  
 [2-methylfuran (I), thiophene (II), 2-methylthiophene,  
 2,5-dimethylthiophene, pyrrole (III), and 4-methylthiazole] in amts.

0.2-1.0 vol.%, on the charge-discharge characteristics of Li anodes were investigated in propylene carbonate (IV)- or DMSO-based electrolytes. The addn. of II to IV-based electrolytes improved the coulombic efficiency of the cycle, and the addn. of III was effective for cycling in LiPF6/DMSO. The effect of the addn. of I was significant in the solns. contg. LiPF6. The coulombic efficiency of the Li anode was detd. by a galvanostatic charge/discharge cycle on a Ni substrate. Based on a.c. impedance behavior of the electrode/electrolyte interface, the additive effects are related to changes in the interface structure.

IT 7439-93-2, Lithium, uses and miscellaneous

RL: USES (Uses)  
(anodes, charge-discharge behavior of, in electrolytes contg. heterocyclic compd., for batteries)

RN 7439-93-2 HCPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

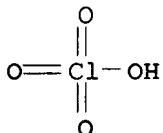
Li

IT 7791-03-9, Lithium perchlorate

RL: USES (Uses)  
(electrolytes, in org. solvents, lithium battery anode performance in, heterocyclic compd. additive effect on)

RN 7791-03-9 HCPLUS

CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 109-97-7, Pyrrole 110-02-1, Thiophene

534-22-5, 2-Methylfuran 554-14-3,  
2-Methylthiophene 638-02-8, 2,5-Dimethylthiophene

RL: USES (Uses)  
(lithium perchlorate-propylene carbonate electrolyte contg., charge-discharge behavior of lithium anodes in, for secondary batteries)

RN 109-97-7 HCPLUS

CN 1H-Pyrrole (9CI) (CA INDEX NAME)

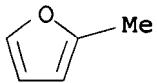


RN 110-02-1 HCPLUS

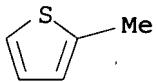
CN Thiophene (8CI, 9CI) (CA INDEX NAME)



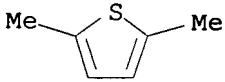
RN 534-22-5 HCAPLUS  
 CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



RN 554-14-3 HCAPLUS  
 CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



RN 638-02-8 HCAPLUS  
 CN Thiophene, 2,5-dimethyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 72, 76  
 ST lithium battery electrolyte heterocyclic compd;  
 anode lithium battery efficiency electrolyte  
 IT Batteries, secondary  
 (lithium, heterocyclic compd.-contg. electrolytes for)  
 IT Electric impedance  
 (of lithium electrode in lithium perchlorate-propylene carbonate  
 electrolyte, thiophene additive effect on)  
 IT Anodes  
 (battery, lithium, charge-discharge behavior of, in  
 electrolytes contg. heterocyclic compd.)  
 IT 7439-93-2, Lithium, uses and miscellaneous  
 RL: USES (Uses)  
 (anodes, charge-discharge behavior of, in electrolytes  
 contg. heterocyclic compd., for batteries)  
 IT 67-68-5, Dmso, uses and miscellaneous 108-32-7, Propylene  
 carbonate  
 RL: USES (Uses)  
 (electrolytes contg., lithium anode performance in,  
 heterocyclic compd. additive effect on, for rechargeable  
 batteries)  
 IT 7791-03-9, Lithium perchlorate 21324-40-3, Lithium  
 hexafluorophosphate  
 RL: USES (Uses)

(electrolytes, in org. solvents, lithium  
battery anode performance in, heterocyclic compd.  
additive effect on)

IT 109-97-7, Pyrrole 110-02-1, Thiophene  
534-22-5, 2-Methylfuran 554-14-3,  
2-Methylthiophene 638-02-8, 2,5-Dimethylthiophene  
693-95-8, 4-Methylthiazole  
RL: USES (Uses)  
(lithium perchlorate-propylene carbonate electrolyte  
contg., charge-discharge behavior of lithium anodes in, for  
secondary batteries)

L117 ANSWER 32 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1989:118256 HCAPLUS  
DOCUMENT NUMBER: 110:118256  
TITLE: Behavior of some additives on secondary lithium  
electrode in organic electrolyte  
AUTHOR(S): Matsuda, Y.; Morita, M.  
CORPORATE SOURCE: Fac. Eng., Yamaguchi Univ., Ube, Japan  
SOURCE: Battery Material Symposium, [Proceedings] (1987), 3, 153-4  
CODEN: BMSPEW  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB The addn. of crown ethers into the electrolyte soln. of  
rechargeable Li batteries scarcely affected the  
charge-discharge cycling efficiency of the Li anode. The addn. of  
aliph. ethers into the electrolyte did not improve the  
coulombic efficiency in charge-discharge cycling of Li anodes,  
except in the case of propylene carbonate (I)-LiPF<sub>6</sub> system contg.  
di- or triethylene glycol Me ether. The charge-discharge efficiency  
was improved by the addn. of thiophene into I-LiClO<sub>4</sub>, I-LiPF<sub>6</sub>, or  
I-THF/LiPF<sub>6</sub>; 2-methylfuran into I-LiPF<sub>6</sub>, I-THF-LiPF<sub>6</sub>, or DMSO-LiPF<sub>6</sub>;  
pyrrole into I-THF/LiPF<sub>6</sub> or DMSO/LiPF<sub>6</sub>; and 4-methylthiazole into  
I-LiPF<sub>6</sub>.

IT 7439-93-2, Lithium, uses and miscellaneous

RL: USES (Uses)  
(anodes, performance of, in org. electrolytes contg.  
crown ether and aliph. polyether and unsatd. cyclic compd.  
additives, for secondary battery)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

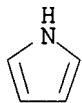
Li

IT 109-97-7, Pyrrole 110-02-1, Thiophene  
534-22-5, 2-Methylfuran 554-14-3,  
2-Methylthiophene 638-02-8, 2,5-Dimethylthiophene

RL: USES (Uses)  
(electrolyte contg., secondary lithium battery  
performance in relation to)

RN 109-97-7 HCAPLUS

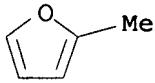
CN 1H-Pyrrole (9CI) (CA INDEX NAME)



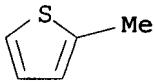
RN 110-02-1 HCAPLUS  
 CN Thiophene (8CI, 9CI) (CA INDEX NAME)



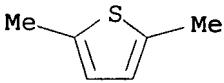
RN 534-22-5 HCAPLUS  
 CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



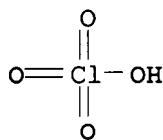
RN 554-14-3 HCAPLUS  
 CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



RN 638-02-8 HCAPLUS  
 CN Thiophene, 2,5-dimethyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7791-03-9, Lithium perchlorate  
 RL: USES (Uses)  
 (electrolytes, in org. solvents, contg. crown ether and  
 aliph. polyether and unsatd. cyclic compd., secondary lithium  
 battery performance in relation to)  
 RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



## ● Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium **battery** performance **electrolyte**  
 additive; crown ether additive lithium **battery**; polyether  
 additive **electrolyte** lithium **battery**; cyclic  
 compd additive lithium **battery**  
 IT **Batteries**, secondary  
 (lithium, with org. **electrolytes**, performance of, crown  
 ether and aliph. polyether and unsatd. cyclic compd. effect on)  
 IT 7439-93-2, Lithium, uses and miscellaneous  
 RL: USES (Uses)  
 (anodes, performance of, in org. **electrolytes** contg.  
 crown ether and aliph. polyether and unsatd. cyclic compd.  
 additives, for secondary **battery**)  
 IT 109-86-4, 2-Methoxyethanol 109-97-7, Pyrrole  
 110-02-1, Thiophene 111-77-3, Diethylene glycol monomethyl  
 ether 112-35-6, Triethylene glycol monomethyl ether 294-93-9,  
 12-Crown-4 534-22-5, 2-Methylfuran 554-14-3,  
 2-Methylthiophene 638-02-8, 2,5-Dimethylthiophene  
 693-95-8, 4-Methylthiazole 33100-27-5, 15-Crown-5  
 RL: USES (Uses)  
 (**electrolyte** contg., secondary lithium **battery**  
 performance in relation to)  
 IT 109-99-9, Thf, uses and miscellaneous 110-71-4,  
 1,2-Dimethoxyethane 629-14-1, 1,2-Diethoxyethane 5137-45-1,  
 1-Ethoxy-2-methoxyethane  
 RL: USES (Uses)  
 (**electrolyte** solvent contg., lithium secondary  
**battery** with, additive effect on)  
 IT 67-68-5, Dmso, uses and miscellaneous 108-32-7, Propylene  
 carbonate  
 RL: USES (Uses)  
 (**electrolyte** solvent, lithium secondary **battery**  
 with, additive effect on)  
 IT 7791-03-9, Lithium perchlorate 14283-07-9, Lithium  
 tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate  
 RL: USES (Uses)  
 (**electrolytes**, in org. solvents, contg. crown ether and  
 aliph. polyether and unsatd. cyclic compd., secondary lithium  
**battery** performance in relation to)

L117 ANSWER 33 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 1989:79266 HCAPLUS  
 DOCUMENT NUMBER: 110:79266  
 TITLE: Behavior of some additives on secondary lithium  
 electrode in organic **electrolytes**  
 AUTHOR(S): Matsuda, Y.; Morita, M.  
 CORPORATE SOURCE: Fac. Eng., Yamaguchi Univ., Ube, 755, Japan  
 SOURCE: Progress in Batteries & Solar Cells (

1988), 7, 266-70  
 CODEN: PBASDR; ISSN: 0198-7259

DOCUMENT TYPE:

Journal

LANGUAGE:

English

AB The effect of org. additives to propylene carbonate (I)-based electrolytes for secondary Li batteries was evaluated in terms of improved cycling efficiency (CE) of the Li anodes. Some aliph. polyethers (THF, 1,2-dimethoxyethane, 1-ethoxy-2-methoxyethane, 1,2-diethoxyethane) added to I, promoted a decrease in the polarization of the Li anode and improved CE, but other aliph. ethers did not. Crown ethers added to the electrolyte affected the CE of Li anodes, but the CE of TiS<sub>2</sub> cathodes improved in electrolytes contg. crown ethers. The interactions between the additive and electrolyte, esp. the counterion had a strong effect on the Li anode, esp. regarding the double layer structure based on species adsorbed on the Li surface. 31245 45123.

IT 7439-93-2, Lithium, uses and miscellaneous

RL: USES (Uses)

(anodes, cycling efficiency of, in propylene carbonate-lithium salt electrolytes, org. additive effect on)

RN 7439-93-2 HCPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 109-97-7, Pyrrole 110-02-1, Thiophene 534-22-5, 2-Methylfuran 554-14-3, 2-Methylthiophene 7791-03-9, Lithium perchlorate (LiClO<sub>4</sub>)

RL: USES (Uses)

(electrolytes contg. lithium salt and propylene carbonate and, lithium anode cycling efficiency in)

RN 109-97-7 HCPLUS

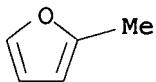
CN 1H-Pyrrole (9CI) (CA INDEX NAME)



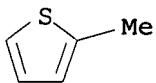
RN 110-02-1 HCPLUS  
 CN Thiophene (8CI, 9CI) (CA INDEX NAME)



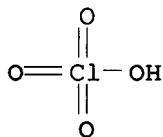
RN 534-22-5 HCPLUS  
 CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



RN 554-14-3 HCAPLUS  
 CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 72  
 ST propylene carbonate **electrolyte** org additive; lithium  
**battery** propylene carbonate **electrolyte**; anode  
 lithium org additive **electrolyte**; ether crown  
**electrolyte** lithium anode; titanium sulfide cathode org  
**electrolyte**  
 IT Batteries, secondary  
 (lithium, propylene carbonate-lithium salt  
 electrolytes for, org. additive effect on)  
 IT Anodes  
 (**battery**, lithium, cycling efficiency of, in propylene  
 carbonate-lithium salt **electrolyte**,  
 org. additive effect on)  
 IT 7439-93-2, Lithium, uses and miscellaneous  
 RL: USES (Uses)  
 (anodes, cycling efficiency of, in propylene carbonate-  
 lithium salt **electrolytes**, org.  
 additive effect on)  
 IT 109-86-4, 2-Methoxyethanol 109-97-7, Pyrrole 109-99-9,  
 THF, uses and miscellaneous 110-02-1, Thiophene  
 110-71-4, 1,2-Dimethoxyethane 111-77-3, Diethylene glycol  
 monomethyl ether 112-35-6, Triethylene glycol monomethyl ether  
 294-93-9, 12-Crown-4 534-22-5, 2-Methylfuran  
 554-14-3, 2-Methylthiophene 629-14-1, 1,2-Diethoxyethane  
 693-95-8, 4-Methylthiazole 5137-45-1, 1-Ethoxy-2-methoxyethane  
 7791-03-9, Lithium perchlorate (LiClO<sub>4</sub>) 33100-27-5,  
 15-Crown-5  
 RL: USES (Uses)  
 (**electrolytes** contg. lithium salt

and propylene carbonate and, lithium anode cycling efficiency in)  
 IT 108-32-7, Propylene carbonate  
 RL: USES (Uses)  
 (electrolytes contg. lithium salt  
 and, org. additives for, lithium anode cycling efficiency in)  
 IT 14283-07-9, Lithium tetrafluoroborate (LiBF<sub>4</sub>) 29935-35-1, Lithium hexafluoroarsenate  
 RL: USES (Uses)  
 (electrolytes contg. propylene carbonate and org.  
 additive and, lithium anode cycling efficiency in)

L117 ANSWER 34 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 1988:207665 HCAPLUS  
 DOCUMENT NUMBER: 108:207665  
 TITLE: Addition effects of some organic compounds on the cycling behavior of lithium electrode  
 AUTHOR(S): Matsuda, Y.; Hayashida, H.; Morita, M.  
 CORPORATE SOURCE: Fac. Eng., Yamaguchi Univ., Ube, 755, Japan  
 SOURCE: Proceedings - Electrochemical Society (1988), 88-6(Proc. Symp. Primary Second. Ambient Temp. Lithium Batteries, 1987), 610-17  
 CODEN: PESODO; ISSN: 0161-6374  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 AB The cycling efficiency (CE) of Li anodes was improved by addn. of org. compds. such as thiophene to propylene carbonate-based electrolytes. Addn. of pyrrole to DMSO/LiPF<sub>6</sub> also improves the Li anode CE. The additives induce changes in the structure of the electrode-electrolyte interface involving the electrode double layer and surface film.  
 IT 7439-93-2, Lithium, uses and miscellaneous  
 RL: USES (Uses)  
 (anodes, improved cycling efficiency of, thiophene and pyrrole electrolyte additives for)  
 RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

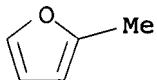
IT 109-97-7, Pyrrole 110-02-1, Thiophene  
 534-22-5, 2-Methylfuran 554-14-3,  
 2-Methylthiophene 638-02-8, 2,5-Dimethylthiophene  
 RL: USES (Uses)  
 (electrolytes contg., lithium anode cycle efficiency improvement by)  
 RN 109-97-7 HCAPLUS  
 CN 1H-Pyrrole (9CI) (CA INDEX NAME)



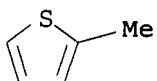
RN 110-02-1 HCAPLUS  
 CN Thiophene (8CI, 9CI) (CA INDEX NAME)



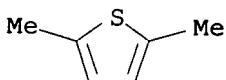
RN 534-22-5 HCAPLUS  
 CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



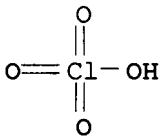
RN 554-14-3 HCAPLUS  
 CN Thiophene, 2-methyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



RN 638-02-8 HCAPLUS  
 CN Thiophene, 2,5-dimethyl- (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7791-03-9, Lithium perchlorate (LiClO<sub>4</sub>)  
 RL: USES (Uses)  
 (electrolytes contg., thiophene additive in, lithium  
 anode cycle efficiency in relation to)  
 RN 7791-03-9 HCAPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 72  
 ST lithium anode cycling life additive; thiophene electrolyte  
 lithium anode cycling; pyrrole electrolyte lithium anode  
 cycling; battery lithium anode cycling life  
 IT Electric impedance  
 (of lithium anodes, in DMSO-lithium hexafluorophosphate  
 electrolytes, additive effect on)

IT Anodes  
 (battery, lithium, improved cycling efficiency of, thiophene and pyrrole electrolyte additives for)

IT 7439-93-2, Lithium, uses and miscellaneous  
 RL: USES (Uses)  
 (anodes, improved cycling efficiency of, thiophene and pyrrole electrolyte additives for)

IT 67-68-5, DMSO, uses and miscellaneous 2537-36-2, Tetramethylammonium perchlorate 21324-40-3, Lithium hexafluorophosphate (LiPF<sub>6</sub>)  
 RL: USES (Uses)  
 (electrolytes contg., additives for, lithium anode cycling efficiency in relation to)

IT 109-97-7, Pyrrole 109-99-9, THF, uses and miscellaneous 110-02-1, Thiophene 110-71-4 534-22-5, 2-Methylfuran 554-14-3, 2-Methylthiophene 638-02-8, 2,5-Dimethylthiophene 693-95-8, 4-Methylthiazole  
 RL: USES (Uses)  
 (electrolytes contg., lithium anode cycle efficiency improvement by)

IT 108-32-7, Propylene carbonate 7791-03-9, Lithium perchlorate (LiClO<sub>4</sub>)  
 RL: USES (Uses)  
 (electrolytes contg., thiophene additive in, lithium anode cycle efficiency in relation to)

L117 ANSWER 35 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1988:64511 HCAPLUS  
 DOCUMENT NUMBER: 108:64511  
 TITLE: Oxidation potentials of electrolyte solutions for lithium cells  
 AUTHOR(S): Ossola, F.; Pistoia, G.; Seeber, R.; Ugo, P.  
 CORPORATE SOURCE: Ist. Chim. Tecnol. Radioelem., C. N. R., Padova, Italy  
 SOURCE: Electrochimica Acta (1988), 33(1), 47-50  
 CODEN: ELCAAV; ISSN: 0013-4686

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The oxidn. potentials, E<sub>ox</sub> of several solns. of interest for nonaq. Li cells were measured by linear sweep voltammetric expts. A correlation is found between E<sub>ox</sub> and the basicity of the solvents, expressed by their donor nos. (DN). Esters and sulfones have higher resistance to oxidn. than ethers, which possess the highest DN values. All solns. had E<sub>ox</sub> > 4 V vs. Li/Li<sup>+</sup>. However, some reactivity between pos. electrodes and solns. was obsd. below this potential.

IT 7439-93-2, Lithium, uses and miscellaneous

RL: USES (Uses)  
 (batteries, primary, oxidn. potential of electrolyte solns. for)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

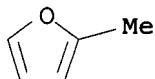
IT 12423-04-0  
 RL: PRP (Properties)

(electrodes, in lithium cells, oxidn. potential of  
electrolyte solns. in relation to)

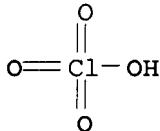
RN 12423-04-0 HCAPLUS  
CN Lithium vanadium oxide (LiV<sub>3</sub>O<sub>8</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2
V	3	7440-62-2
Li	1	7439-93-2

IT 534-22-5, 2-Methylfuran  
RL: PRP (Properties)  
(oxidn. potential of electrolyte solns. of  
methyltetrahydrofuran and THF and, in lithium cells)  
RN 534-22-5 HCAPLUS  
CN Furan, 2-methyl- (8CI, 9CI) (CA INDEX NAME)



IT 7791-03-9, Lithium perchlorate  
RL: PRP (Properties)  
(oxidn. potentials of electrolyte solns. for lithium  
cells contg.)  
RN 7791-03-9 HCAPLUS  
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

CC 72-2 (Electrochemistry)  
Section cross-reference(s): 23, 27, 52, 78  
ST lithium cell electrolyte oxidn potential  
IT Batteries, primary  
(lithium, oxidn. of electrolyte solns. in)  
IT Cathodes  
(teflonized acetylene black, in lithium batteries)  
IT Electric potential  
(oxidn., of electrolyte solns., basicity of solvents  
effect on)  
IT 7439-93-2, Lithium, uses and miscellaneous  
RL: USES (Uses)  
(batteries, primary, oxidn. potential of  
electrolyte solns. for)  
IT 7440-44-0, Carbon, uses and miscellaneous  
RL: USES (Uses)

(electrode from glassy, in lithium cell, oxidn. potential of  
 electrolyte solns. in relation to)

IT 7440-06-4, Platinum, uses and miscellaneous  
 RL: USES (Uses)  
 (electrode, in lithium cells, oxidn. potentials of  
 electrolyte solns. in relation to)

IT 12423-04-0  
 RL: PRP (Properties)  
 (electrodes, in lithium cells, oxidn. potential of  
 electrolyte solns. in relation to)

IT 96-47-9, 2-Methyltetrahydrofuran  
 RL: PRP (Properties)  
 (oxidn. potential of electrolyte solns. of THF and, in  
 lithium cells)

IT 126-33-0, Sulfolane  
 RL: PRP (Properties)  
 (oxidn. potential of electrolyte solns. of benzene and,  
 in lithium cells)

IT 108-32-7, Propylene carbonate  
 RL: PRP (Properties)  
 (oxidn. potential of electrolyte solns. of  
 dimethoxyethane and, in lithium cells)

IT 534-22-5, 2-Methylfuran  
 RL: PRP (Properties)  
 (oxidn. potential of electrolyte solns. of  
 methyltetrahydrofuran and THF and, in lithium cells)

IT 109-99-9, properties  
 RL: PRP (Properties)  
 (oxidn. potential of electrolyte solns. of  
 methyltetrahydrofuran and, in lithium cells)

IT 71-43-2, Benzene, properties  
 RL: PRP (Properties)  
 (oxidn. potential of electrolyte solns. of sulfolane  
 and, in lithium cells)

IT 107-31-3, Methylformate  
 RL: PRP (Properties)  
 (oxidn. potential of electrolyte solns. of, in lithium  
 cells)

IT 110-71-4, Dimethoxyethane  
 RL: PRP (Properties)  
 (oxidn. potential of electrolyte solns. of, in presence  
 and in absence of propylene carbonate, in lithium cells)

IT 7791-03-9, Lithium perchlorate 29935-35-1  
 RL: PRP (Properties)  
 (oxidn. potentials of electrolyte solns. for lithium  
 cells contg.)

L117 ANSWER 36 OF 36 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1987:543533 HCAPLUS  
 DOCUMENT NUMBER: 107:143533  
 TITLE: Characteristics of electrochemically synthesized  
 polymer electrodes in lithium cells - III.  
 Polypyrrole  
 AUTHOR(S): Panero, S.; Prosperi, P.; Bonino, F.; Scrosati,  
 B.; Corradini, A.; Mastragostino, M.  
 CORPORATE SOURCE: Dip. Chim., Univ. Roma "La Sapienza", Rome,  
 Italy  
 SOURCE: Electrochimica Acta (1987), 32(7),  
 1007-11  
 CODEN: ELCAAV; ISSN: 0013-4686

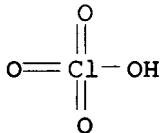
DOCUMENT TYPE: Journal  
 LANGUAGE: English

AB The characteristics of electrochem. synthesized polypyrrole electrodes were examd. in the LiClO<sub>4</sub>-propylene carbonate electrolyte, by cyclic voltammetry, charge-discharge cycling, frequency response anal. and by visible-near IR absorption spectra. These polymer electrodes behave satisfactorily in terms of kinetics of the electrochem. doping process, cyclability and charge-discharge efficiency. Their performance under high rates may be limited by the diffusion of the perchlorate counterion. Polypyrrole was more stable than other conducting polymers in org. electrolytes of interest for the development of rechargeable Li batteries.

IT 7439-93-2, Lithium, uses and miscellaneous  
 RL: USES (Uses)  
 (battery, secondary, with polypyrrole)  
 RN 7439-93-2 HCPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 7791-03-9, Lithium perchlorate  
 RL: PRP (Properties)  
 (electrochem. redox reaction of perchlorate-doped polypyrrole in propylene carbonate contg., doping-undoping in relation to)  
 RN 7791-03-9 HCPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 109-97-7, Pyrrole  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (polymn. of, electrochem., on platinum in acetonitrile contg.  
 lithium perchlorate)  
 RN 109-97-7 HCPLUS  
 CN 1H-Pyrrole (9CI) (CA INDEX NAME)



CC 72-2 (Electrochemistry)  
 Section cross-reference(s): 35, 36, 52  
 ST polypyrrole electrogenerated electrode; battery lithium  
 polypyrrole; redox electrochem perchlorate doped polypyrrole;

conducting polymer polypyrrole electrodeposition  
 IT **Batteries, secondary**  
 (lithium-polypyrrole, with propylene carbonate contg. lithium perchlorate)  
 IT **Cathodes**  
 (battery, polypyrrole)  
 IT **7439-93-2, Lithium, uses and miscellaneous**  
 RL: USES (Uses)  
 (battery, secondary, with polypyrrole)  
 IT **7791-03-9, Lithium perchlorate**  
 RL: PRP (Properties)  
 (electrochem. redox reaction of perchlorate-doped polypyrrole in propylene carbonate contg., doping-undoping in relation to)  
 IT **109-97-7, Pyrrole**  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (polymn. of, electrochem., on platinum in acetonitrile contg. lithium perchlorate)

=> d 1123 ibib abs hitstr hitind 1-5

L123 ANSWER 1 OF 5 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2006:689399 HCAPLUS  
 DOCUMENT NUMBER: 145:127638  
 TITLE: Nonaqueous electrolyte solution for lithium secondary batteries  
 INVENTOR(S): Ahn, Sun Ho; Cho, Jeong Ju; Kim, Hyeong Jin; Lee, Han Ho; Lee, Ho Chun; Lee, Jae Heon; Son, Mi Yeong  
 PATENT ASSIGNEE(S): Lg Chem. Ltd., S. Korea  
 SOURCE: Repub. Korean Kongkae Taeho Kongbo, No pp. given  
 CODEN: KRXXA7  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Korean  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

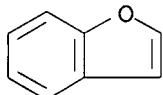
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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KR 2004023870	A	20040320	KR 2002-55309	200209 12
PRIORITY APPLN. INFO.:			KR 2002-55309	200209 12

AB In this Li battery with a nonaq. electrolyte soln. overcharge current is blocked through polymn. of electrolyte components by degrdn. due to oxidn., thereby improving safety. The nonaq. electrolyte soln. comprises a Li salt, an electrolyte soln. compd., 0.5-5% of a nonconductive polymer monomer, and 0.1-2% of a conductive polymer monomer. Preferably the nonconductive polymer monomer is cyclohexylbenzene, isopropylbenzene or 5-butylbenzene; and the conductive polymer monomer is biphenyl, 1-phenyl-1-cyclohexane or benzofuran. The Li secondary battery comprises a cathode, an anode, a porous separator, and the nonaq. electrolyte soln.

IT **271-89-6, Benzofuran**  
 RL: DEV (Device component use); USES (Uses)

(electrolyte contg.; nonaq. electrolyte soln: for lithium secondary batteries with safety feature)

RN 271-89-6 HCAPLUS  
 CN Benzofuran (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium secondary battery nonaq electrolyte safety  
 IT Secondary batteries  
     (lithium; nonaq. electrolyte soln. for lithium secondary batteries with safety feature)  
 IT Battery electrolytes  
     Safety  
     (nonaq. electrolyte soln. for lithium secondary batteries with safety feature)  
 IT 92-52-4, Biphenyl, uses 98-82-8, Isopropylbenzene 135-98-8  
 271-89-6, Benzofuran 827-52-1  
 RL: DEV (Device component use); USES (Uses)  
     (electrolyte contg.; nonaq. electrolyte soln. for lithium secondary batteries with safety feature)

L123 ANSWER 2 OF 5 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2005:1005599 HCAPLUS  
 DOCUMENT NUMBER: 143:289485  
 TITLE: Secondary battery  
 INVENTOR(S): Ishii, Hariyoshi; Saruwatari, Hidesato; Hirai, Takahiro; Takami, Norio  
 PATENT ASSIGNEE(S): Toshiba Corp., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 16 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

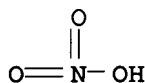
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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JP 2005251683	A2	20050915	JP 2004-64083	200403 08
PRIORITY APPLN. INFO.:			JP 2004-64083	200403 08

AB The battery has a cathode; an anode, contg.  $\geq 1$  anode active mass selected from Al, Al alloys, Mg, and Mg alloys; and an electrolyte soln., contg. an org. compd. which has a porphyrin structured base-backbone, its deriv., and/or an ion of the org. compd.

IT 7790-69-4, Lithium nitrate 10377-48-7, Lithium sulfate  
 RL: DEV (Device component use); USES (Uses)

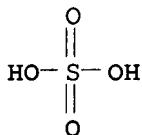
(anodes contg. Al (alloys) and/or Mg (alloys) and electrolyte  
solns. contg. porphyrin compds. for secondary **batteries**  
)

RN 7790-69-4 HCAPLUS  
CN Nitric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



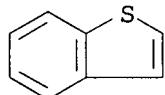
● Li

RN 10377-48-7 HCAPLUS  
CN Sulfuric acid, dilithium salt (8CI, 9CI) (CA INDEX NAME)



●2 Li

IT 95-15-8, Thio naphthene  
RL: MOA (Modifier or additive use); USES (Uses)  
(anodes contg. Al (alloys) and/or Mg (alloys) and electrolyte  
solns. contg. porphyrin compds. for secondary **batteries**  
)  
RN 95-15-8 HCAPLUS  
CN Benzo[b]thiophene (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M006-06  
ICS H01M004-06; H01M004-46  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST secondary **battery** anode aluminum magnesium alloy;  
**battery** electrolyte porphyrin compd  
IT **Battery** anodes  
**Battery** electrolytes  
**Secondary batteries**  
(anodes contg. Al (alloys) and/or Mg (alloys) and electrolyte  
solns. contg. porphyrin compds. for secondary **batteries**  
)  
IT 96-48-0,  $\gamma$ -Butyrolactone 623-53-0, Methyl ethyl carbonate  
1313-13-9, Manganese dioxide, uses 7429-90-5, Aluminum, uses  
7446-70-0, Aluminum chloride, uses 7447-41-8, Lithium chloride,

uses 7631-99-4, Sodium nitrate, uses 7664-93-9, Sulfuric acid,  
 uses 7757-79-1, Potassium nitrate, uses 7783-20-2, Ammonium  
 sulfate, uses 7786-30-3, Magnesium chloride, uses  
 7790-69-4, Lithium nitrate 10377-48-7, Lithium  
 sulfate 10377-60-3, Magnesium nitrate 11109-06-1 12125-02-9,  
 Ammonium chloride, uses 12780-46-0 37326-54-8 57921-51-4  
 125196-14-7 278798-61-1

RL: DEV (Device component use); USES (Uses)  
 (anodes contg. Al (alloys) and/or Mg (alloys) and electrolyte  
 solns. contg. porphyrin compds. for secondary **batteries**  
 )

IT 67-03-8, Thiamin hydrochloride 95-15-8, Thio naphthene  
 109-99-9, THF, uses 110-02-1, Thiophene 288-47-1, Thiazole  
 289-72-5, Thiopyran 574-93-6, Phthalocyanine 4396-11-6,  
 Porphyrinogen 35218-75-8D, derivs. 51094-17-8D, derivs.  
 60475-00-5, Thiopyran

RL: MOA (Modifier or additive use); USES (Uses)  
 (anodes contg. Al (alloys) and/or Mg (alloys) and electrolyte  
 solns. contg. porphyrin compds. for secondary **batteries**  
 )

L123 ANSWER 3 OF 5 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:633136 HCAPLUS

DOCUMENT NUMBER: 139:152388

TITLE: Nonaqueous electrolyte compositions for lithium  
 secondary **batteries**

INVENTOR(S): Song, Eui-hwan; Jung, Won-il; Hwang, Duck-chul

PATENT ASSIGNEE(S): S. Korea

SOURCE: U.S. Pat. Appl. Publ., 5 pp., Cont.-in-part of  
 U.S. Ser. No. 565,158, abandoned.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 2003152840	A1	20030814	US 2002-278354	200210 22

PRIORITY APPLN. INFO.:	DATE
US 2000-565158	B2 200005 03

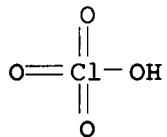
AB Disclosed are nonaq. electrolyte compns. of the present invention  
 that comprise nonaq. solvents and monomers such as aniline,  
 phenanthrene, ethylenedioxythiophene, benzothiophene or derivs.  
 thereof. The monomers are contained in the electrolytes of the  
 present invention in the amts. of less than about 5.0 wt.% of the  
 nonaq. solvent. In the present invention, cyclic carbonates, linear  
 carbonates or mixts. thereof can be used as the nonaq. solvents.  
 The electrolyte compns. of the present invention improve the safety  
 characteristics of the cell by preventing the flow of large currents  
 resulting from overcharge or feed-through, and also improve cell  
 life characteristic by helping the reversible transfer of lithium  
 ions.

IT 7791-03-9, Lithium perchlorate 33454-82-9, Lithium  
 triflate

RL: DEV (Device component use); USES (Uses)  
 (nonaq. electrolyte compns. for lithium secondary  
 batteries)

RN 7791-03-9 HCPLUS

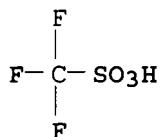
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 33454-82-9 HCPLUS

CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



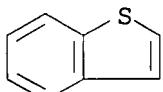
● Li

IT 95-15-8, Benzothiophene

RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte compns. for lithium secondary  
 batteries)

RN 95-15-8 HCPLUS

CN Benzo[b]thiophene (8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-40

ICS H01M004-60; H01M004-58

INCL 429338000; 429342000; 429213000; 429231400

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38

ST nonaq electrolyte compn lithium secondary battery; safety  
 nonaq electrolyte compn lithium secondary battery

IT Carbonaceous materials (technological products)

RL: MOA (Modifier or additive use); SPN (Synthetic preparation);

PREP (Preparation); USES (Uses)

(graphitized; nonaq. electrolyte compns. for lithium secondary  
 batteries)

IT Secondary batteries  
(lithium; nonaq. electrolyte compns. for lithium secondary batteries)

IT Pitch fibers  
(mesophase; nonaq. electrolyte compns. for lithium secondary batteries)

IT Battery electrolytes  
Carbonization  
Conducting polymers  
Graphitization  
(nonaq. electrolyte compns. for lithium secondary batteries)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate  
623-53-0, Ethyl methyl carbonate 7791-03-9, Lithium perchlorate 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate 210353-06-3, Cobalt lithium nickel strontium oxide  
RL: DEV (Device component use); USES (Uses)  
(nonaq. electrolyte compns. for lithium secondary batteries)

IT 85-01-8, Phenanthrene, uses 95-15-8, Benzothiophene  
126213-51-2, Poly(Ethylenedioxythiophene)  
RL: MOA (Modifier or additive use); USES (Uses)  
(nonaq. electrolyte compns. for lithium secondary batteries)

L123 ANSWER 4 OF 5 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2001:46267 HCAPLUS

DOCUMENT NUMBER: 134:118341

TITLE: Secondary nonaqueous electrolyte batteries using improved anodes and electrolytes, and manufacture of the batteries

INVENTOR(S): Maekawa, Yukio

PATENT ASSIGNEE(S): Fuji Photo Film Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 13 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

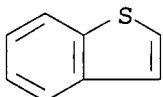
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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JP 2001015172	A2	20010119	JP 1999-240599	199908 26
PRIORITY APPLN. INFO.:			JP 1999-118296	A 199904 26

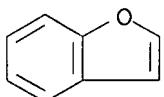
AB Secondary nonaq. electrolyte batteries have cathode sheets contg. Li-contg. mixed rare earth oxides as active materials, anode sheets contg. Li-intercalatable C materials and having auxiliary layers bonded to Li-based metal foils, and nonaq. electrolytes contg. Li salts and additives selected from hydrazines and arom. compds. The battery components are assembled and aged for permeation of

Li into the anodes to give the secondary batteries. The batteries have high capacity.

IT 95-15-8, Benzothiophene 271-89-6, Benzofuran  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
 (electrolyte solns. contg.; secondary nonaq.  
 electrolyte batteries using anodes bonded to  
 Li-contg. foils and electrolytes contg. hydrazines  
 and/or arom. compds.)  
 RN 95-15-8 HCPLUS  
 CN Benzo[b]thiophene (8CI, 9CI) (CA INDEX NAME)



RN 271-89-6 HCPLUS  
 CN Benzofuran (6CI, 8CI, 9CI) (CA INDEX NAME)



IT 7439-93-2, Lithium, uses  
 RL: DEV (Device component use); USES (Uses)  
 (foil; secondary nonaq. electrolyte batteries  
 using anodes bonded to Li-contg. foils and electrolytes  
 contg. hydrazines and/or arom. compds.)  
 RN 7439-93-2 HCPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IC ICM H01M010-40  
 ICS H01M010-40; H01M004-02; H01M004-58  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST nonaq electrolyte battery anode carbon lithium;  
 hydrazine nonaq electrolyte lithium battery;  
 arom compd nonaq electrolyte lithium battery  
 IT Carbonaceous materials (technological products)  
 RL: DEV (Device component use); USES (Uses)  
 (anodes; secondary nonaq. electrolyte batteries  
 using anodes bonded to Li-contg. foils and electrolytes  
 contg. hydrazines and/or arom. compds.)  
 IT Heterocyclic compounds  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
 (arom.; secondary nonaq. electrolyte batteries  
 using anodes bonded to Li-contg. foils and electrolytes  
 contg. hydrazines and/or arom. compds.)  
 IT Aromatic compounds  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES

(Uses)  
 (heterocyclic; secondary nonaq. **electrolyte**  
**batteries** using anodes bonded to Li-contg. foils and  
**electrolytes** contg. hydrazines and/or arom. compds.)

IT Secondary batteries  
 (lithium; secondary nonaq. **electrolyte**  
**batteries** using anodes bonded to Li-contg. foils and  
**electrolytes** contg. hydrazines and/or arom. compds.)

IT Carbon fibers, uses  
 RL: DEV (Device component use); USES (Uses)  
 (mesophase pitch-based, anodes; secondary nonaq.  
**electrolyte batteries** using anodes bonded to  
 Li-contg. foils and **electrolytes** contg. hydrazines  
 and/or arom. compds.)

IT **Battery** anodes  
**Battery** cathodes  
**Battery** electrolytes  
 (secondary nonaq. **electrolyte batteries** using  
 anodes bonded to Li-contg. foils and **electrolytes**  
 contg. hydrazines and/or arom. compds.)

IT 7440-44-0, Carbon, uses 7782-42-5, Graphite, uses  
 RL: DEV (Device component use); USES (Uses)  
 (anodes; secondary nonaq. **electrolyte batteries**  
 using anodes bonded to Li-contg. foils and **electrolytes**  
 contg. hydrazines and/or arom. compds.)

IT 12190-79-3, Cobalt lithium oxide (colio<sub>2</sub>)  
 RL: DEV (Device component use); USES (Uses)  
 (cathodes; secondary nonaq. **electrolyte**  
**batteries** using anodes bonded to Li-contg. foils and  
**electrolytes** contg. hydrazines and/or arom. compds.)

IT 95-15-8, Benzothiophene 260-94-6, Acridine  
 271-89-6, Benzofuran 2171-74-6, Catechol cyclic carbonate  
 15429-36-4  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES  
 (Uses)  
 (**electrolyte** solns. contg.; secondary nonaq.  
**electrolyte batteries** using anodes bonded to  
 Li-contg. foils and **electrolytes** contg. hydrazines  
 and/or arom. compds.)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate  
 108-32-7, Propylene carbonate  
 RL: DEV (Device component use); USES (Uses)  
 (**electrolyte** solns.; secondary nonaq.  
**electrolyte batteries** using anodes bonded to  
 Li-contg. foils and **electrolytes** contg. hydrazines  
 and/or arom. compds.)

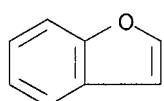
IT 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium  
 hexafluorophosphate  
 RL: DEV (Device component use); USES (Uses)  
 (**electrolyte**; secondary nonaq. **electrolyte**  
**batteries** using anodes bonded to Li-contg. foils and  
**electrolytes** contg. hydrazines and/or arom. compds.)

IT 7439-93-2, Lithium, uses  
 RL: DEV (Device component use); USES (Uses)  
 (foil; secondary nonaq. **electrolyte batteries**  
 using anodes bonded to Li-contg. foils and **electrolytes**  
 contg. hydrazines and/or arom. compds.)

DOCUMENT NUMBER: 132:154449  
 TITLE: Secondary nonaqueous electrolyte  
**batteries**  
 INVENTOR(S): Takahashi, Masatoshi; Yasutake, Zensaku; Abe,  
 Hiroshi; Ueki, Akira; Takai, Tsutomu  
 PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan; Ube Industries,  
 Ltd.  
 SOURCE: Jpn. Kokai Tokkyo Koho, 15 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2000058117	A2	20000225	JP 1998-218001	199807 31
JP 2983205	B2	19991129	JP 1998-218001	199807 31
PRIORITY APPLN. INFO.:				

OTHER SOURCE(S): MARPAT 132:154449  
 AB The **batteries** use an electrolyte soln. contg. a **Li** salt dissolved in an arom. ether ROR', where R = C<sub>6</sub>H<sub>5</sub>, allyl, or alkylphenyl group; R' = C<sub>1-6</sub> alkyl, Ph, allyl, or alkylphenyl group; and R and R' many form a C<sub>5-6</sub> ring.  
 IT 271-89-6, Benzofuran  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (electrolyte solvents contg. arom. ether derivs. for secondary lithium **batteries**)  
 RN 271-89-6 HCAPLUS  
 CN Benzofuran (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST **battery** electrolyte lithium salt arom  
 ether solvent  
 IT **Battery** electrolytes  
 (electrolyte solvents contg. arom. ether derivs. for secondary lithium **batteries**)  
 IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate  
 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate  
 14283-07-9, Lithium fluoroborate 21324-40-3, Lithium  
 hexafluorophosphate  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte solvents contg. arom. ether derivs. for secondary lithium **batteries**)  
 IT 101-84-8, Diphenyl ether 271-89-6, Benzofuran 557-40-4,  
 Diallyl ether 1579-40-4 3586-14-9 3739-64-8, Butyl allyl ether

RL: MOA (Modifier or additive use); USES (Uses)  
 (electrolyte solvents contg. arom. ether derivs. for secondary lithium batteries)

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L142 ANSWER 1 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:1239360 HCAPLUS

DOCUMENT NUMBER: 144:8990

TITLE: Polymer electrolyte secondary lithium batteries with long cycle life and good stability at high temperature

INVENTOR(S): Wada, Yoshihiko; Miura, Katsuhito; Matsui, Shohei; Tabuchi, Masato

PATENT ASSIGNEE(S): Daiso Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 15 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2005327566	A2	20051124	JP 2004-143916	200405 13
PRIORITY APPLN. INFO.:			JP 2004-143916	200405 13

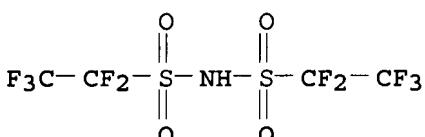
AB The batteries have crosslinked polymer electrolyte compns. consisting of (a) multi-component copolymer polyethers with Mw 104-107, (b) aprotic org. solvents, (c) low-mol.-wt. S compds. and/or N compds. as additives, and (d) Li salts as electrolytes. In the batteries, side reactions between electrodes and electrolytes are prevented by the additives c.

IT 132843-44-8, Lithium bis(perfluoroethylsulfonyl)imide

RL: DEV (Device component use); USES (Uses)  
 (electrolytes contg. polyoxyalkylenes; thermally stable secondary lithium batteries contg. sulfur and/or nitrogen compds. in polymer electrolytes)

RN 132843-44-8 HCAPLUS

CN Ethanesulfonamide, 1,1,2,2,2-pentafluoro-N-[(pentafluoroethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)

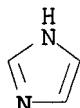


● Li

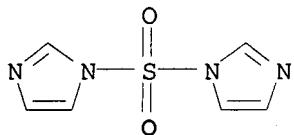
IT 7439-93-2DP, Lithium, complexes with glycidyl (meth)acrylate-ethylene oxide copolymers  
 RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)  
 (electrolytes; thermally stable secondary lithium batteries contg. sulfur and/or nitrogen compds. in polymer electrolytes)  
 RN 7439-93-2 HCPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

IT 288-32-4D, Imidazole, derivs. 7189-69-7, 1,1'-Sulfonyldiimidazole  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
 (thermally stable secondary lithium batteries contg. sulfur and/or nitrogen compds. in polymer electrolytes)  
 RN 288-32-4 HCPLUS  
 CN 1H-Imidazole (9CI) (CA INDEX NAME)



RN 7189-69-7 HCPLUS  
 CN 1H-Imidazole, 1,1'-sulfonylbis- (9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 ICS C08G065-321; C08K003-00; C08K005-00; C08L071-00; H01M006-18  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST polymer electrolyte lithium battery thermally stable; polyoxyalkylene lithium complex battery electrolyte sulfur nitrogen; secondary battery polymer electrolyte sulfite oxazole  
 IT Polyoxyalkylenes, uses  
 RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)  
 (acrylic, lithium complexes, electrolytes; thermally stable secondary lithium batteries contg. sulfur and/or nitrogen compds. in polymer electrolytes)  
 IT Polyoxyalkylenes, uses  
 RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)  
 (lithium complexes, electrolytes; thermally stable secondary lithium batteries contg. sulfur and/or

nitrogen compds. in polymer **electrolytes**)

IT Secondary batteries  
(lithium; thermally stable secondary lithium **batteries** contg. sulfur and/or nitrogen compds. in polymer **electrolytes**)

IT Sulfonic acids, uses  
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
(salts; thermally stable secondary lithium **batteries** contg. sulfur and/or nitrogen compds. in polymer **electrolytes**)

IT Lactones  
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
(sultones; thermally stable secondary lithium **batteries** contg. sulfur and/or nitrogen compds. in polymer **electrolytes**)

IT **Battery electrolytes**  
**Polymer electrolytes**  
(thermally stable secondary lithium **batteries** contg. sulfur and/or nitrogen compds. in polymer **electrolytes**)

IT Sulfates, uses  
Sulfites  
Sulfones  
Sulfoxides  
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
(thermally stable secondary lithium **batteries** contg. sulfur and/or nitrogen compds. in polymer **electrolytes**)

IT 815574-41-5DP, lithium complexes 815574-42-6DP, lithium complexes  
RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)  
(crosslinked, **electrolytes**; thermally stable secondary lithium **batteries** contg. sulfur and/or nitrogen compds. in polymer **electrolytes**)

IT 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate  
108-32-7, Propylene carbonate  
RL: DEV (Device component use); USES (Uses)  
(electrolyte solvents; thermally stable secondary lithium **batteries** contg. sulfur and/or nitrogen compds. in polymer **electrolytes**)

IT 14283-07-9, Lithium tetrafluoroborate 132843-44-8, Lithium bis(perfluoroethylsulfonyl)imide  
RL: DEV (Device component use); USES (Uses)  
(electrolytes contg. polyoxyalkylenes; thermally stable secondary lithium **batteries** contg. sulfur and/or nitrogen compds. in polymer **electrolytes**)

IT 7439-93-2DP, Lithium, complexes with glycidyl (meth)acrylate-ethylene oxide copolymers 26282-59-7DP, lithium complexes  
RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)  
(electrolytes; thermally stable secondary lithium **batteries** contg. sulfur and/or nitrogen compds. in polymer **electrolytes**)

IT 120-72-9D, Indole, derivs. 288-14-2D, Isoxazole, derivs.  
288-32-4D, Imidazole, derivs. 288-42-6, Oxazole  
289-80-5D, Pyridazine, derivs. 289-95-2D, Pyrimidine, derivs.  
290-37-9D, Pyrazine, derivs. 352-93-2, Diethyl sulfide 597-35-3, Diethyl sulfone 617-92-5, 1-Ethylpyrrole 1600-44-8,

Tetramethylene sulfoxide 1633-83-6, 1,4-Butanesultone 3741-38-6,  
 Glycol sulfite 7189-69-7, 1,1'-Sulfonyldiimidazole  
 12654-97-6D, Triazine, derivs. 74124-79-1, N,N'-Disuccinimidyl  
 carbonate  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES  
 (Uses)  
 (thermally stable secondary lithium batteries contg.  
 sulfur and/or nitrogen compds. in polymer electrolytes)

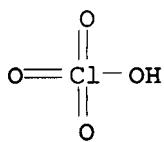
L142 ANSWER 2 OF 9 HCPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2005:160702 HCPLUS  
 DOCUMENT NUMBER: 142:243650  
 TITLE: **Electrolyte composition for lithium  
 battery**  
 INVENTOR(S): Roh, Kwon Sun; Choi, Jong Hyuk; Park, Chi Kyun;  
 Lee, Jon Ha  
 PATENT ASSIGNEE(S): SKC Co., Ltd., S. Korea  
 SOURCE: U.S. Pat. Appl. Publ., 5 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2005042519	A1	20050224	US 2004-920162	200408 18
CN 1612403	A	20050504	CN 2004-10092105	200408 19
PRIORITY APPLN. INFO.:			KR 2003-57276	A 200308 19

AB An **electrolyte compn.**, a **lithium battery** using  
 the **electrolyte compn.**, and a method of manufg. the  
**lithium battery** are provided. The **electrolyte**  
 compn. includes: a **lithium salt**, and an org.  
 solvent contg. a nitrogen-contg. compd., propane sultone, and  
 vinylene carbonate and/or cyclohexylbenzene. The  
**electrolyte compn.** ensures a **battery** safety when  
 operated at high temp. without performance degrdn.  
 IT 7439-93-2D, **Lithium, salt**  
 7791-03-9, **Lithium perchlorate** 33454-82-9, **Lithium**  
 triflate 90076-65-6  
 RL: DEV (Device component use); USES (Uses)  
 (**electrolyte compn.** for **lithium battery**)  
 RN 7439-93-2 HCPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

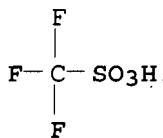
Li

RN 7791-03-9 HCPLUS  
 CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



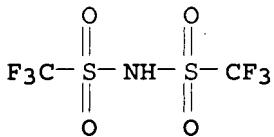
## ● Li

RN 33454-82-9 HCAPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



## ● Li

RN 90076-65-6 HCAPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



## ● Li

IT 288-47-1, Thiazole  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (electrolyte compn. for lithium battery)  
 RN 288-47-1 HCAPLUS  
 CN Thiazole (6CI, 8CI, 9CI) (CA INDEX NAME)



IC ICM H01M010-40  
 ICS H01M010-04  
 INCL 429330000; 429326000; 429314000; 029623200  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST electrolyte compn lithium **battery**; safety  
 electrolyte compn lithium **battery**

IT Heterocyclic compounds  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (arom.; electrolyte compn. for lithium **battery**)

IT **Battery electrolytes**  
 Safety  
 (electrolyte compn. for lithium **battery**)

IT Epoxides  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (electrolyte compn. for lithium **battery**)

IT Aromatic compounds  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (heterocyclic; electrolyte compn. for lithium  
**battery**)

IT Secondary batteries  
 (lithium; electrolyte compn. for lithium  
**battery**)

IT Amines, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (polymers; electrolyte compn. for lithium  
**battery**)

IT Amines, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (primary; electrolyte compn. for lithium  
**battery**)

IT Amines, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (secondary; electrolyte compn. for lithium  
**battery**)

IT Amines, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (tertiary; electrolyte compn. for lithium  
**battery**)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate  
 108-32-7, Propylene carbonate 7439-93-2D, Lithium  
 , salt 7440-44-0, Carbon, uses 7791-03-9,  
 Lithium perchlorate 9002-88-4, Polyethylene 9003-07-0,  
 Polypropylene 12190-79-3, Cobalt lithium oxide (CoLiO<sub>2</sub>)  
 14283-07-9, Lithium tetrafluoroborate 18424-17-4, Lithium  
 hexafluoro antimonate 21324-40-3, Lithium hexafluorophosphate  
 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium  
 triflate 90076-65-6  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte compn. for lithium **battery**)

IT 110-86-1, Pyridine, uses 288-47-1, Thiazole 289-06-5,  
 Thiadiazole 289-80-5, Pyridazine 289-95-2, Pyrimidine  
 290-37-9, Pyrazine 827-52-1, Cyclohexylbenzene 872-36-6,  
 Vinylene carbonate 1120-71-4, Propane sultone 2425-79-8,  
 1,4-Butanediol diglycidyl ether 12654-97-6, Triazine 24980-54-9,  
 Styrene-2-vinylpyridine copolymer 37306-44-8, Triazole  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (electrolyte compn. for lithium **battery**)

L142 ANSWER 3 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:904490 HCAPLUS

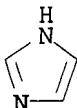
DOCUMENT NUMBER: 141:359083

TITLE: Polymer solid **electrolytes** with high  
 ion conductivity

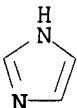
INVENTOR(S) : Matsuyama, Mutsuhiro; Watanabe, Takeshi  
 PATENT ASSIGNEE(S) : Sumitomo Bakelite Co., Ltd., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 9 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2004303492	A2	20041028	JP 2003-92927	200303 28
PRIORITY APPLN. INFO.:			JP 2003-92927	200303 28

AB The **electrolytes** contain imidazolium salts contg. ≥2 polymerizable groups or their derivs. The **electrolytes** may contain homopolymers of the above compds. or their copolymers with other monomers. Preferably, the **electrolytes** contain alkali metal salts. The **electrolytes** have high flexibility, mech. strength, storage stability, leak resistance, etc., and are suitable for batteries, capacitors, solar cells, gel actuators, etc.  
 IT 288-32-4DP, Imidazole, Bis(styrylmethyl) quaternary ammonium chlorides and bis(trifluoromethansulfone)imides, polymer derivs.  
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)  
 (monomer from; polymerizable imidazolium salt-based polymer solid **electrolytes** with high ion cond.)  
 RN 288-32-4 HCPLUS  
 CN 1H-Imidazole (9CI) (CA INDEX NAME)

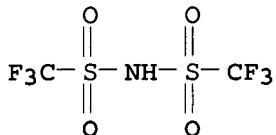


IT 288-32-4, Imidazole, reactions 90076-65-6, Lithium bis(trifluoromethanesulfonyl)imide  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (monomer from; polymerizable imidazolium salt-based polymer solid **electrolytes** with high ion cond.)  
 RN 288-32-4 HCPLUS  
 CN 1H-Imidazole (9CI) (CA INDEX NAME)



RN 90076-65-6 HCPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,

lithium salt (9CI) (CA INDEX NAME)



## ● Li

IT 7439-93-2DP, Lithium, acrylic imidazolium polymer complex  
 RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polymerizable imidazolium salt-based polymer solid electrolytes with high ion cond.)

RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

## Li

IC ICM H01B001-06  
 ICS C08G061-12; H01M010-40  
 CC 76-2 (Electric Phenomena)  
 Section cross-reference(s): 38  
 ST polymer solid electrolyte imidazolium polymerizable group; ion cond polymerizable imidazolium salt polymer electrolyte  
 IT Polymer electrolytes  
 (polymerizable imidazolium salt-based polymer solid electrolytes with high ion cond.)  
 IT 288-32-4DP, Imidazole, Bis(styrylmethyl) quaternary ammonium chlorides and bis(trifluoromethansulfone)imides, polymer derivs.  
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)  
 (monomer from; polymerizable imidazolium salt-based polymer solid electrolytes with high ion cond.)  
 IT 288-32-4, Imidazole, reactions 1592-20-7, p-Chloromethylstyrene 90076-65-6, Lithium bis(trifluoromethanesulfonyl)imide  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (monomer from; polymerizable imidazolium salt-based polymer solid electrolytes with high ion cond.)  
 IT 97-90-5DP, Ethylene glycol dimethacrylate, polymer derivs. with acryloylmorpholine, acryloyloxypropyltrimethylammonium bis(trifluoromethanesulfonyl)imide, and bis(styrylmethyl)imidazolium bis(trifluoromethansulfone)imide, lithium complexes 5117-12-4DP, Acryloylmorpholine, polymer derivs. with acryloyloxypropyltrimethylammonium bis(trifluoromethanesulfone)imide, bis(styrylmethyl)imidazolium bis(trifluoromethansulfone)imide, and ethylene glycol dimethacrylate, lithium complexes 7439-93-2DP, Lithium, acrylic imidazolium polymer complex 676578-35-1DP, polymer derivs. with acryloylmorpholine, bis(styrylmethyl)imidazolium bis(trifluoromethansulfone)imide, and ethylene glycol dimethacrylate, lithium complexes  
 RL: IMF (Industrial manufacture); TEM (Technical or engineered

material use); PREP (Preparation); USES (Uses)  
 (polymerizable imidazolium salt-based polymer solid  
 electrolytes with high ion cond.)

L142 ANSWER 4 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2004:392771 HCAPLUS  
 DOCUMENT NUMBER: 140:378118  
 TITLE: **Electrolyte composition for lithium**  
**secondary battery having high**  
**overcharge-safety**  
 INVENTOR(S): Roh, Kwonsun; Choi, Jonghyuk; Lee, Jaemyoung;  
 Lee, Jonha  
 PATENT ASSIGNEE(S): SKC Limited, S. Korea  
 SOURCE: PCT Int. Appl., 15 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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WO 2004040687	A1	20040513	WO 2003-KR2274	200310 27
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			
KR 2004037534	A	20040507	KR 2002-66067	200210 29
AU 2003272137	A1	20040525	AU 2003-272137	200310 27
PRIORITY APPLN. INFO.:			KR 2002-66067	A
				200210 29
			WO 2003-KR2274	W
				200310 27

AB An **electrolyte** compn. comprising a nitrogen-contg. compd.,  
 cyclohexyl benzene, an org. solvent and a **lithium**  
**salt** is advantageously used for the prepn. of a lithium  
 secondary **battery** having high overcharge-safety, cycling  
 life and high-temp. swelling properties at the same time.

IT 288-47-1, Thiazole 7439-93-2D, Lithium,  
 salt 7791-03-9, Lithium perchlorate  
 33454-82-9, Lithium triflate 90076-65-6

RL: DEV (Device component use); USES (Uses)  
 (electrolyte compn. for lithium secondary  
 battery having high overcharge-safety)

RN 288-47-1 HCAPLUS

CN Thiazole (6CI, 8CI, 9CI) (CA INDEX NAME)



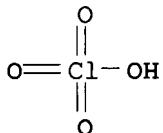
RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7791-03-9 HCAPLUS

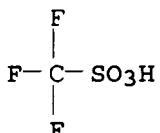
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 33454-82-9 HCAPLUS

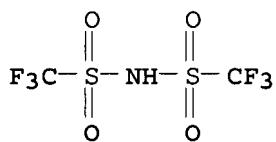
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 90076-65-6 HCAPLUS

CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



## ● Li

IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST electrolyte compn lithium secondary **battery** high  
 overcharge safety  
 IT **Battery electrolytes**  
 Safety  
 (electrolyte compn. for lithium secondary  
 battery having high overcharge-safety)  
 IT Polymers, uses  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte compn. for lithium secondary  
 battery having high overcharge-safety)  
 IT Epoxy resins, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (electrolyte compn. for lithium secondary  
 battery having high overcharge-safety)  
 IT Secondary batteries  
 (lithium; electrolyte compn. for lithium secondary  
 battery having high overcharge-safety)  
 IT Heterocyclic compounds  
 RL: DEV (Device component use); USES (Uses)  
 (nitrogen; electrolyte compn. for lithium secondary  
 battery having high overcharge-safety)  
 IT Amines, uses  
 RL: DEV (Device component use); USES (Uses)  
 (tertiary; electrolyte compn. for lithium secondary  
 battery having high overcharge-safety)  
 IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate  
 110-86-1, Pyridine, uses 121-44-8, Triethylamine, uses  
 288-47-1, Thiazole 289-06-5, Thiadiazole 289-80-5,  
 Pyridazine 289-95-2, Pyrimidine 290-37-9D, Pyrazine, salt  
 616-38-6, Dimethyl carbonate 827-52-1, Cyclohexylbenzene  
 2425-79-8, 1,4-Butanediol diglycidyl ether 7439-93-2D,  
 Lithium, salt 7727-37-9D, Nitrogen, compd.  
 7791-03-9, Lithium perchlorate 9003-47-8,  
 Polyvinylpyridine 9019-70-9, Styrene-vinylpyridine copolymer  
 12190-79-3, Cobalt lithium oxide colio2 12654-97-6, Triazine  
 14283-07-9, Lithium tetrafluoroborate 18424-17-4, Lithium  
 hexafluoroantimonate 21324-40-3, Lithium hexafluorophosphate  
 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium  
 triflate 37306-44-8, Triazole 90076-65-6  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte compn. for lithium secondary  
 battery having high overcharge-safety)  
 IT 7440-44-0, Carbon, uses  
 RL: DEV (Device component use); USES (Uses)  
 (mesocarbon microbeads; electrolyte compn. for lithium  
 secondary **battery** having high overcharge-safety)

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L142 ANSWER 5 OF 9 HCPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2004:41827 HCPLUS  
 DOCUMENT NUMBER: 140:79851  
 TITLE: **Electrolyte composition for lithium secondary battery having high overcharge-safety**  
 INVENTOR(S): Park, Chi-Kyun; Zhang, Zhiwei; Chai, Chul; Lee, Jonha; Roh, Kwonsun  
 PATENT ASSIGNEE(S): SKC Limited, S. Korea  
 SOURCE: PCT Int. Appl., 18 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	-----	-----	-----	-----
WO 2004006378	A1	20040115	WO 2003-KR1332	200307 07
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			
KR 2004006057	A	20040124	KR 2002-39570	200207 09
AU 2003281410	A1	20040123	AU 2003-281410	200307 07
PRIORITY APPLN. INFO.:			KR 2002-39570	A
				200207 09
			WO 2003-KR1332	W
				200307 07

AB An **electrolyte** compn. comprising a nitrogen-contg. compd., biphenyl, an org. solvent and a **lithium salt** is advantageously used for the prepn. of a lithium secondary **battery** having high overcharge-safety, cycling life and capacity properties.

IT 288-47-1, Thiazole 7439-93-2D, Lithium, salt 7791-03-9, Lithium perchlorate 33454-82-9, Lithium triflate 90076-65-6

RL: DEV (Device component use); USES (Uses)  
 (electrolyte compn. for lithium secondary  
 battery having high overcharge-safety)

RN 288-47-1 HCAPLUS

CN Thiazole (6CI, 8CI, 9CI) (CA INDEX NAME)



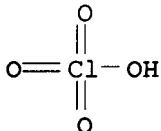
RN 7439-93-2 HCAPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7791-03-9 HCAPLUS

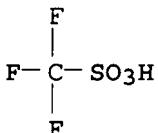
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 33454-82-9 HCAPLUS

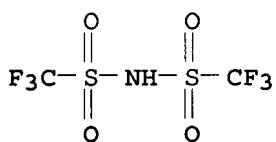
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

RN 90076-65-6 HCAPLUS

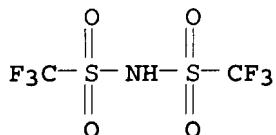
CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



## ● Li

IC ICM H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST electrolyte compn lithium secondary **battery** high  
     overcharge safety  
 IT **Battery electrolytes**  
     Safety  
         (electrolyte compn. for lithium secondary  
           battery having high overcharge-safety)  
 IT Epoxides  
     Halogen compounds  
         RL: MOA (Modifier or additive use); USES (Uses)  
           (electrolyte compn. for lithium secondary  
           battery having high overcharge-safety)  
 IT Secondary batteries  
     (lithium; electrolyte compn. for lithium secondary  
       battery having high overcharge-safety)  
 IT Heterocyclic compounds  
     RL: DEV (Device component use); USES (Uses)  
         (nitrogen, arom.; electrolyte compn. for lithium  
           secondary **battery** having high overcharge-safety)  
 IT Heterocyclic compounds  
     RL: DEV (Device component use); USES (Uses)  
         (polymer, nitrogen-contg., arom.; electrolyte compn.  
           for lithium secondary **battery** having high  
           overcharge-safety)  
 IT Amines, uses  
     RL: DEV (Device component use); USES (Uses)  
         (tertiary; electrolyte compn. for lithium secondary  
           battery having high overcharge-safety)  
 IT 92-52-4, Biphenyl, uses 96-49-1, Ethylene carbonate 105-58-8,  
     Diethyl carbonate 110-86-1, Pyridine, uses 121-44-8,  
     Triethylamine, uses 288-47-1, Thiazole 289-06-5,  
     Thiadiazole 289-80-5, Pyridazine 289-95-2, Pyrimidine  
     290-37-9, Pyrazine 616-38-6, Dimethyl carbonate 7439-93-2D  
     , Lithium, salt 7791-03-9, Lithium  
     perchlorate 9003-47-8, Polyvinylpyridine 9019-70-9,  
     Styrene-vinylpyridine copolymer 12190-79-3, Cobalt lithium oxide  
     colio2 12654-97-6, Triazine 14283-07-9, Lithium  
     tetrafluoroborate 18424-17-4, Lithium hexafluoroantimonate  
     21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium  
     hexafluoroarsenate 33454-82-9, Lithium triflate  
     37306-44-8, Triazole 90076-65-6  
     RL: DEV (Device component use); USES (Uses)  
         (electrolyte compn. for lithium secondary  
           battery having high overcharge-safety)  
 IT 2386-87-0, 3,4-Epoxycyclohexylmethyl-3',4'-epoxycyclohexane  
     carboxylate  
     RL: MOA (Modifier or additive use); USES (Uses)





## ● Li

IT 7439-93-2, Lithium, uses  
 RL: DEV (Device component use); NUU (Other use, unclassified); TEM  
 (Technical or engineered material use); USES (Uses)  
 (ionic liqs. in polymer gel **battery electrolytes**)  
 RN 7439-93-2 HCAPLUS  
 CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

## Li

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38  
 ST ionic liq polymer gel **battery electrolyte**  
 IT Polymers, uses  
 RL: DEV (Device component use); NUU (Other use, unclassified); TEM  
 (Technical or engineered material use); USES (Uses)  
 (gels; ionic liqs. in polymer gel **battery electrolytes**)  
 IT **Battery electrolytes**  
 Cyclic voltammetry  
 Ionic conductivity  
 Ionic liquids  
 Solid **electrolytes**  
 (ionic liqs. in polymer gel **battery electrolytes**)  
 IT Secondary batteries  
 (lithium; ionic liqs. in polymer gel **battery electrolytes**)  
 IT Salts, uses  
 RL: DEV (Device component use); NUU (Other use, unclassified); TEM  
 (Technical or engineered material use); USES (Uses)  
 (org., molten; ionic liqs. in polymer gel **battery electrolytes**)  
 IT 108-10-1, 4-Methyl-2-pentanone 109-69-3, 1-Chlorobutane  
 540-54-5, 1-Chloropropane 1739-84-0, 1,2-Dimethylimidazole  
 16941-11-0, Ammonium hexafluorophosphate 90076-65-6,  
 Lithium bistrifluoromethanesulfonylimide  
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical  
 process); PROC (Process)  
 (ionic liqs. in polymer gel **battery electrolytes**)  
 IT 1314-62-1, Vanadium oxide V2O5, uses 7439-93-2, Lithium,  
 uses 9011-17-0 12057-17-9, Lithium manganese oxide LiMn2O4  
 12190-79-3, Lithium cobalt oxide LiCoO2 169051-76-7 350493-08-2  
 RL: DEV (Device component use); NUU (Other use, unclassified); TEM  
 (Technical or engineered material use); USES (Uses)  
 (ionic liqs. in polymer gel **battery**)

electrolytes)

IT 7782-42-5, Graphite, uses  
 RL: DEV (Device component use); NUU (Other use, unclassified); TEM  
 (Technical or engineered material use); USES (Uses)  
 (paper; ionic liqs. in polymer gel **battery**  
 electrolytes)

REFERENCE COUNT: 23 THERE ARE 23 CITED REFERENCES AVAILABLE  
 FOR THIS RECORD. ALL CITATIONS AVAILABLE  
 IN THE RE FORMAT

L142 ANSWER 7 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2000:665699 HCAPLUS

DOCUMENT NUMBER: 133:254952

TITLE: Polymer electrolyte for lithium  
 secondary batteries

INVENTOR(S): Oyama, Noboru

PATENT ASSIGNEE(S): Japan

SOURCE: Eur. Pat. Appl., 32 pp.  
 CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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EP 1037294	A2	20000920	EP 2000-105773	200003 17
EP 1037294	A3	20030730		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO			
JP 2001189166	A2	20010710	JP 2000-70790	200003 14
CA 2301414	AA	20000917	CA 2000-2301414	200003 16
US 6509122	B1	20030121	US 2000-527569	200003 16
CN 1267683	A	20000927	CN 2000-104319	200003 17
AU 770639	B2	20040226	AU 2000-22331	200003 17
US 2003082458	A1	20030501	US 2002-227532	200208 26
PRIORITY APPLN. INFO.:			JP 1999-71758	A 199903 17
			JP 1999-295503	A 199910 18
			US 2000-527569	A3

200003  
16

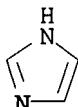
AB A polymer **electrolyte** providing lithium secondary **batteries** in which growth of lithium dendrites is suppressed and **batteries** exhibiting excellent discharge characteristics in low to high temp., comprises a polymer gel holding a nonaq. solvent contg. an **electrolyte**. The polymer gel comprises (I) a unit derived from at least one monomer having one copolymerizable vinyl group and (II) a unit derived from at least one compd. selected from the group consisting of (II-a) a compd. having two acryloyl groups and a (poly)oxyethylene group, (II-b) a compd. having one acryloyl group and a (poly)oxyethylene group, and (II-c) a glycidyl ether compd., particularly the polymer gel comprises monomer (I), compd. (II-a), and a copolymerizable plasticizing compd.

IT 288-32-4D, Imidazole, alkyl deriv. 7439-93-2,  
Lithium, uses 7791-03-9, Lithium perchlorate  
33454-82-9, Lithium triflate 90076-65-6  
131651-65-5

RL: DEV (Device component use); USES (Uses)  
(polymer **electrolyte** for lithium secondary **batteries**)

RN 288-32-4 HCAPLUS

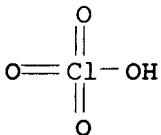
CN 1H-Imidazole (9CI) (CA INDEX NAME)



RN 7439-93-2 HCAPLUS  
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

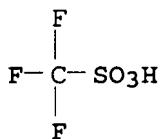
Li

RN 7791-03-9 HCAPLUS  
CN Perchloric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



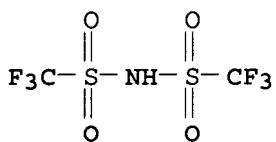
● Li

RN 33454-82-9 HCAPLUS  
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



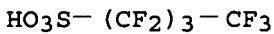
## ● Li

RN 90076-65-6 HCPLUS  
 CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-,  
 lithium salt (9CI) (CA INDEX NAME)



## ● Li

RN 131651-65-5 HCPLUS  
 CN 1-Butanesulfonic acid, 1,1,2,2,3,3,4,4,4-nonafluoro-, lithium salt  
 (9CI) (CA INDEX NAME)



## ● Li

IC ICM H01M006-18  
 ICS C08L071-02  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38, 76  
 ST lithium **battery** polymer **electrolyte**  
 IT Pyridinium compounds  
 RL: DEV (Device component use); USES (Uses)  
 (alkyl; polymer **electrolyte** for lithium secondary  
 batteries)  
 IT Secondary **batteries**  
 (lithium; polymer **electrolyte** for lithium secondary  
 batteries)  
 IT **Battery electrolytes**  
 Capacitors  
 Polymer **electrolytes**  
 (polymer **electrolyte** for lithium secondary  
 batteries)  
 IT Amides, uses  
 Lactones  
 Nitriles, uses  
 Polyanilines

RL: DEV (Device component use); USES (Uses)  
 (polymer **electrolyte** for lithium secondary  
**batteries**)

IT Phosphonium compounds  
 Quaternary ammonium compounds, uses  
 RL: DEV (Device component use); USES (Uses)  
 (tetraalkyl; polymer **electrolyte** for lithium secondary  
**batteries**)

IT 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate  
 108-32-7, Propylene carbonate 288-32-4D, Imidazole, alkyl  
 deriv. 1072-71-5, 2,5-Dimercapto-1,3,4-thiadiazole  
 7439-93-2, Lithium, uses 7791-03-9, Lithium  
 perchlorate 9063-88-1, Blemmer PDE 400-methyl methacrylate  
 copolymer 14283-07-9, Lithium tetrafluoroborate 21324-40-3,  
 Lithium hexafluorophosphate 25101-19-3, Methylmethacrylate-  
 triethylene glycol dimethacrylate copolymer 25233-30-1,  
 Polyaniline 25777-71-3, Blemmer PDE 50-methyl methacrylate  
 copolymer 27308-26-5, Blemmer PDE 100-methyl methacrylate  
 copolymer 29403-27-8 29935-35-1, Lithium hexafluoroarsenate  
 33454-82-9, Lithium triflate 35895-69-3,  
 Tetraethylammonium trifluoromethanesulfonate 59049-11-5, Blemmer  
 PME 150-methyl methacrylate copolymer 72892-39-8, Blemmer PE  
 200-methyl methacrylate copolymer 81381-02-4, Acrylonitrile-  
 triethylene glycol dimethacrylate copolymer 90076-65-6  
 114388-54-4, Cyclohexyl methacrylate-methyl methacrylate-triethylene  
 glycol dimethacrylate copolymer 129283-05-2 130425-25-1, Blemmer  
 PME 100-methyl methacrylate copolymer 131651-65-5  
 132404-42-3 144442-23-9 294189-08-5 294189-09-6, Methyl  
 methacrylate-2-methacryloyloxyethyl phthalate-triethylene glycol  
 dimethacrylate copolymer 294189-10-9, Benzyl methacrylate-methyl  
 methacrylate-triethylene glycol dimethacrylate copolymer  
 294189-11-0, Isobornyl methacrylate-methyl methacrylate-triethylene  
 glycol dimethacrylate copolymer 294189-12-1 294189-13-2  
 294189-14-3, 2-Diethylaminoethyl methacrylate-methyl  
 methacrylate-triethylene glycol dimethacrylate copolymer  
 294189-15-4, Methyl methacrylate-triethylene glycol  
 dimethacrylate-trifluoroethyl methacrylate copolymer 294189-16-5,  
 Diethylene glycol monomethacrylate-methyl methacrylate-triethylene  
 glycol dimethacrylate copolymer 294189-17-6, Methoxyethyleneglycol  
 methacrylate-methyl methacrylate-triethylene glycol dimethacrylate  
 copolymer 294189-18-7 294189-20-1  
 RL: DEV (Device component use); USES (Uses)  
 (polymer **electrolyte** for lithium secondary  
**batteries**)

IT 78-67-1, AIBN  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (polymn. initiator; polymer **electrolyte** for lithium  
 secondary **batteries**)

L142 ANSWER 8 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 1999:808567 HCAPLUS  
 DOCUMENT NUMBER: 132:24879  
 TITLE: Solid polymer **electrolyte** rechargeable  
 batteries containing a redox shuttle  
 additive for overcharge protection  
 INVENTOR(S): Richardson, Thomas J.; Ross, Philip N.  
 PATENT ASSIGNEE(S): United States Dept. of Energy, USA  
 SOURCE: U.S., 7 pp.  
 CODEN: USXXAM  
 DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	-----	-----	-----	-----
-----	-----	-----	-----	-----
US 6004698	A	19991221	US 1997-915612	199708 21
PRIORITY APPLN. INFO.:			US 1997-915612	199708 21

AB A class of org. redox shuttle additives is described, preferably comprising nitrogen-contg. aroms. compds., which can be used in a high temp. (85° or higher) **battery** comprising a cathode, an anode, and a solid polymer **electrolyte** to provide overcharge protection to the cell. The org. redox additives or shuttles are characterized by a high diffusion coeff. of at least  $2.1 \times 10^{-8} \text{ cm}^2/\text{s}$  and a high onset potential of 2.5 V or higher. Examples of such org. redox shuttle additives include an alkali metal salt of 1,2,4-triazole, an alkali metal salt of imidazole, 2,3,5,6-tetramethylpyrazine, 1,3,5-tricyanobenzene, and a dialkali metal salt of 3-4-dihydroxy-3-cyclobutene-1,2-dione.

IT 7439-93-2, Lithium, uses 90076-65-6

RL: DEV (Device component use); USES (Uses)  
(solid polymer **electrolyte** rechargeable  
**batteries** contg. redox shuttle additive for overcharge protection)

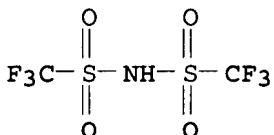
RN 7439-93-2 HCPLUS

CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 90076-65-6 HCPLUS

CN Methanesulfonamide, 1,1,1-trifluoro-N-[(trifluoromethyl)sulfonyl]-, lithium salt (9CI) (CA INDEX NAME)



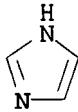
● Li

IT 288-32-4D, Imidazole, alkali metal salt

RL: MOA (Modifier or additive use); USES (Uses)  
(solid polymer **electrolyte** rechargeable  
**batteries** contg. redox shuttle additive for overcharge protection)

RN 288-32-4 HCPLUS

CN 1H-Imidazole (9CI) (CA INDEX NAME)



IC ICM H01M006-18  
 INCL 429305000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST battery redox shuttle additive overcharge protection  
 IT Polyoxyalkylenes, uses  
 RL: DEV (Device component use); USES (Uses)  
 (lithium complex, trifluoromethane sulfonimide contg.; solid  
 polymer electrolyte rechargeable batteries  
 contg. redox shuttle additive for overcharge protection)  
 IT Secondary batteries  
 (lithium; solid polymer electrolyte rechargeable  
 batteries contg. redox shuttle additive for overcharge  
 protection)  
 IT Secondary batteries  
 (solid polymer electrolyte rechargeable  
 batteries contg. redox shuttle additive for overcharge  
 protection)  
 IT 7439-93-2, Lithium, uses 90076-65-6 127575-11-5,  
 Lithium manganese oxide li2mn4o9  
 RL: DEV (Device component use); USES (Uses)  
 (solid polymer electrolyte rechargeable  
 batteries contg. redox shuttle additive for overcharge  
 protection)  
 IT 288-32-4D, Imidazole, alkali metal salt 288-88-0D,  
 1H-1,2,4-Triazole, alkali metal salt 1124-11-4 1518-16-7, Tcnq  
 2892-51-5D, dialkali metal salt 5587-42-8, Sodium imidazole  
 7440-44-0, Carbon, uses 10365-94-3, 1,3,5-Tricyanobenzene  
 41253-21-8, Sodium 1,2,4-Triazole  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (solid polymer electrolyte rechargeable  
 batteries contg. redox shuttle additive for overcharge  
 protection)  
 IT 25322-68-3D, Peo, lithium complex  
 RL: DEV (Device component use); USES (Uses)  
 (trifluoromethane sulfonimide contg.; solid polymer  
 electrolyte rechargeable batteries contg. redox  
 shuttle additive for overcharge protection)

REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE  
 FOR THIS RECORD. ALL CITATIONS AVAILABLE  
 IN THE RE FORMAT

L142 ANSWER 9 OF 9 HCPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 1992:135528 HCPLUS  
 DOCUMENT NUMBER: 116:135528  
 TITLE: Performance-oriented packaging standards;  
 changes to classification, hazard communication,  
 packaging and handling requirements based on UN  
 standards and agency initiative  
 CORPORATE SOURCE: United States Dept. of Transportation,  
 Washington, DC, 20590-0001, USA  
 SOURCE: Federal Register (1990), 55(246), 52402-729, 21  
 Dec 1990

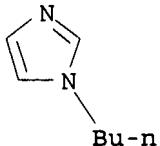
CODEN: FEREAC; ISSN: 0097-6326

DOCUMENT TYPE: Journal  
LANGUAGE: English

AB The hazardous materials regulations under the Federal Hazardous Materials Transportation Act are revised based on the United Nations recommendations on the transport of dangerous goods. The regulations cover the classification of materials, packaging requirements, and package marking, labeling, and shipping documentation, as well as transportation modes and handling, and incident reporting. Performance-oriented stds. are adopted for packaging for bulk and nonbulk transportation, and SI units of measurement generally replace US customary units. Hazardous material descriptions and proper shipping names are tabulated together with hazard class, identification nos., packing group, label required, special provisions, packaging authorizations, quantity limitations, and vessel stowage requirements.

IT 4316-42-1, N-n-Butylimidazole 7439-93-2, Lithium, miscellaneous 7439-93-2D, Lithium, alkyl derivs.  
7790-69-4, Lithium nitrate 13840-33-0, Lithium hypochlorite 13840-33-0D, Lithium hypochlorite, mixts.  
RL: ADV (Adverse effect, including toxicity); PEP (Physical, engineering or chemical process); BIOL (Biological study); PROC (Process)  
(packaging and transport of, stds. for)

RN 4316-42-1 HCPLUS  
CN 1H-Imidazole, 1-butyl- (9CI) (CA INDEX NAME)



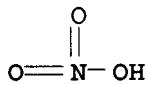
RN 7439-93-2 HCPLUS  
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7439-93-2 HCPLUS  
CN Lithium (7CI, 8CI, 9CI) (CA INDEX NAME)

Li

RN 7790-69-4 HCPLUS  
CN Nitric acid, lithium salt (8CI, 9CI) (CA INDEX NAME)



## ● Li

RN 13840-33-0 HCPLUS  
 CN Hypochlorous acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

Cl-OH

## ● Li

RN 13840-33-0 HCPLUS  
 CN Hypochlorous acid, lithium salt (8CI, 9CI) (CA INDEX NAME)

Cl-OH

## ● Li

CC 59-6 (Air Pollution and Industrial Hygiene)  
 IT Adhesives  
   Alcoholic beverages  
   Ammunition  
   Antifreeze substances  
   Bactericides, Disinfectants, and Antiseptics  
     Batteries, primary  
   Blasting gelatin  
   Bombs (explosives)  
   Carbon paper  
   Cartridges  
   Castor bean  
   Coating materials  
   Corrosive substances  
   Cotton  
   Creosote  
   Detonators  
   Dyes  
   Dynamite  
   Electric fuses  
   Exothermic materials  
   Explosives  
   Flavoring materials  
   Flue dust  
   Fuel cells  
   Fuel oil  
   Fuels, diesel  
   Fuels, jet aircraft

Fusel oil  
 Fuses, explosives  
 Gas oils  
 Hay  
 Herbicides  
 Igniters and Lighters  
 Insecticides  
 Lacrimators  
 Magnetic substances  
 Matches  
 Oxidizing agents  
 Perfumes  
 Pesticides  
 Petroleum products  
 Pharmaceuticals  
 Photoelectric devices  
 Poisons  
 Primers, explosive  
 Projectiles  
 Pyrophoric substances  
 Pyrotechnic compositions  
 Radioactive substances  
 Refrigerating apparatus  
 Rockets  
 Shale oils  
 Solvent naphtha  
 Sprays  
 Straw  
 Textiles  
 Thermoelectric devices  
 Torpedoes (weapons)  
 Turpentine  
 Wood preservatives  
     (packaging and transport of, stds. for)  
 IT 1002-16-0, Amyl nitrate 1070-19-5, tert-Butoxycarbonyl azide  
 1120-21-4, Undecane 1125-27-5 1126-78-9 1187-93-5,  
 Perfluoromethyl vinyl ether 1299-86-1, Aluminum carbide  
 1300-64-7, Anisoyl chloride 1300-71-6, Xylenol 1300-73-8D,  
 derivs. 1303-28-2, Arsenic pentoxide 1303-33-9, Arsenic sulfide  
 1303-33-9D, Arsenic sulfide, mixt. with chlorates 1304-28-5,  
 Barium oxide, miscellaneous 1304-29-6, Barium peroxide  
 1305-78-8, Calcium oxide, miscellaneous 1305-79-9, Calcium  
 peroxide 1305-99-3, Calcium phosphide 1309-60-0, Lead dioxide  
 1310-58-3, Potassium hydroxide, miscellaneous 1310-65-2, Lithium  
 hydroxide 1310-73-2, Sodium hydroxide, miscellaneous 1310-82-3,  
 Rubidium hydroxide 1312-73-8, Potassium sulfide 1313-60-6,  
 Sodium peroxide 1313-82-2, Sodium sulfide, miscellaneous  
 1314-18-7, Strontium peroxide 1314-22-3, Zinc peroxide  
 1314-24-5, Phosphorus trioxide 1314-34-7, Vanadium trioxide  
 1314-56-3, Phosphorus pentoxide, miscellaneous 1314-62-1, Vanadium  
 pentoxide, miscellaneous 1314-80-3, Phosphorus sulfide (P2S5)  
 1314-84-7, Zinc phosphide 1314-85-8, Phosphorus sesquisulfide  
 1319-77-3, Cresylic acid 1320-37-2, Dichlorotetrafluoroethane  
 1321-10-4, Chlorocresol 1321-31-9, Phenetidine 1327-53-3,  
 Arsenic trioxide 1330-20-7, Xylene, miscellaneous 1330-45-6,  
 Chlorotrifluoroethane 1330-78-5, Tricresyl phosphate 1331-22-2,  
 Methyl cyclohexanone 1332-12-3, Fulminating gold 1332-37-2, Iron  
 oxide, properties 1333-39-7, Phenolsulfonic acid 1333-41-1,  
 Picoline 1333-74-0, Hydrogen, miscellaneous 1333-82-0, Chromium  
 trioxide 1333-83-1, Sodium hydrogen fluoride 1335-26-8,

Magnesium peroxide 1335-31-5, Mercury oxycyanide 1335-85-9,  
 Dinitro-o-cresol 1336-21-6, Ammonium hydroxide 1337-81-1  
 1338-23-4, Methyl ethyl ketone peroxide 1341-24-8,  
 Chloroacetophenone 1341-49-7, Ammonium hydrogen fluoride  
 1344-40-7, Lead phosphite, dibasic 1344-67-8, Copper chloride  
 1498-40-4, Ethyl phosphonous dichloride 1498-51-7, Ethyl  
 phosphorodichloridate 1569-69-3, Cyclohexyl mercaptan 1609-86-5,  
 tert-Butyl isocyanate 1623-15-0 1623-24-1, Isopropyl acid  
 phosphate 1634-04-4, Methyl-tert-butyl ether 1693-71-6, Triallyl  
 borate 1705-60-8, 2,2-Di(4,4-di-tert-butylperoxycyclohexyl)propane  
 1712-64-7, Isopropyl nitrate 1719-53-5, Diethyldichlorosilane  
 1737-93-5, 3,5-Dichloro-2,4,6-trifluoropyridine 1789-58-8,  
 Ethyldichlorosilane 1795-48-8, Isopropyl isocyanate 1838-59-1,  
 Allyl formate 1873-29-6, Isobutyl isocyanate 1885-14-9,  
 Phenylchloroformate 1947-27-9, Arsenic trichloride 2050-92-2,  
 Di-n-amylamine 2094-98-6, 1,1'-Azodi(hexahydrobenzonitrile)  
 2144-45-8, Dibenzyl peroxydicarbonate 2155-71-7 2167-23-9,  
 2,2-Di(tert-butylperoxy)butane 2217-06-3, Dipicryl sulfide  
 2243-94-9, 1,3,5-Trinitronaphthalene 2244-21-5, Potassium  
 dichloroisocyanurate 2294-47-5, p-Diazidobenzene 2312-76-7  
 2338-12-7, 5-Nitrobenzotriazole 2487-90-3, Trimethoxysilane  
 2508-19-2, Trinitrobenzenesulfonic acid 2524-03-0, Dimethyl  
 chlorothiophosphate 2524-04-1, Diethylthiophosphoryl chloride  
 2549-51-1, Vinyl chloroacetate 2551-62-4, Sulfur hexafluoride  
 2567-83-1, Tetraethylammonium perchlorate 2657-00-3, Sodium  
 2-diazo-1-naphthol-5-sulfonate 2691-41-0,  
 Cyclotetramethylenetetrannitramine 2696-92-6, Nitrosyl chloride  
 2699-79-8, Sulfuryl fluoride 2782-57-2, Dichloroisocyanuric acid  
 2782-57-2D, Dichloroisocyanuric acid, salts 2820-51-1, Nicotine  
 hydrochloride 2825-15-2 2855-13-2, Isophoronediamine  
 2867-47-2, Dimethylaminoethyl methacrylate 2893-78-9, Sodium  
 dichloroisocyanurate 2937-50-0, Allyl chloroformate 2941-64-2,  
 Ethyl chlorothioformate 2980-64-5 3025-88-5,  
 2,5-Dimethyl-2,5-dihydroperoxy hexane 3031-74-1, Ethyl  
 hydroperoxide 3032-55-1 3054-95-3, 3,3-Diethoxypropene  
 3087-37-4, Tetrapropylorthotitanate 3129-90-6, Isothiocyanic acid  
 3129-91-7, Dicyclohexylammonium nitrite 3132-64-7, Epibromohydrin  
 3165-93-3, 4-Chloro-o-toluidine hydrochloride 3173-53-3,  
 Cyclohexyl isocyanate 3179-56-4, Acetyl cyclohexanesulfonyl  
 peroxide 3188-13-4, Chloromethyl ethyl ether 3248-28-0,  
 Dipropionyl peroxide 3268-49-3 3275-73-8, Nicotine tartrate  
 3282-30-2, Trimethylacetyl chloride 3497-00-5, Phenyl phosphorus  
 thioc dichloride 3689-24-5 3724-65-0, Crotonic acid 3811-04-9,  
 Potassium chlorate 3926-62-3, Sodium chloroacetate 3982-91-0,  
 Thiophosphoryl chloride 4016-11-9, 1,2-Epoxy-3-ethoxypropane  
 4098-71-9 4109-96-0, Dichlorosilane 4170-30-3, Crotonaldehyde  
 4300-97-4 4316-42-1, N-n-Butylimidazole 4419-11-8,  
 2,2'-Azodi(2,4-dimethylvaleronitrile) 4421-50-5 4435-53-4,  
 Butoxyl 4452-58-8, Sodium percarbonate 4472-06-4,  
 Carbonazidodithioic acid 4484-72-4, Dodecyltrichlorosilane  
 4528-34-1 4547-70-0 4591-46-2 4682-03-5, Diazodinitrophenol  
 4795-29-3, Tetrahydrofurfurylamine 4904-61-4, 1,5,9-  
 Cyclododecatriene 5283-66-9, Octyltrichlorosilane 5283-67-0,  
 Nonyltrichlorosilane 5329-14-6, Sulfamic acid 5419-55-6,  
 Triisopropyl borate 5610-59-3, Silver fulminate 5637-83-2,  
 Cyanuric triazide 5653-21-4 5894-60-0, Hexadecyltrichlorosilane  
 5970-32-1, Mercury salicylate 6023-29-6 6275-02-1 6423-43-4  
 6427-21-0, Methoxymethyl isocyanate 6484-52-2, Nitric acid  
 ammonium salt, properties 6484-52-2D, Ammonium nitrate, mixts.  
 with fuel oils 6505-86-8, Nicotine sulfate 6659-60-5,

1,2,4-Butanetriol trinitrate 6842-15-5, Propylene tetramer  
 6867-30-7, Lithium acetylide ethylenediamine complex 7304-92-9  
 7332-16-3, Inositol hexanitrate 7429-90-5, Aluminum, miscellaneous  
 7429-90-5D, Aluminum, alkyl derivs. 7439-90-9, Krypton,  
 miscellaneous 7439-92-1D, Lead, compds. 7439-93-2,  
 Lithium, miscellaneous 7439-93-2D, Lithium, alkyl derivs.  
 7439-95-4, Magnesium, miscellaneous 7439-95-4D, Magnesium, alkyl  
 derivs. 7439-97-6, Mercury, miscellaneous 7439-97-6D, Mercury,  
 compds. 7440-01-9, Neon, miscellaneous 7440-09-7, Potassium,  
 miscellaneous 7440-17-7, Rubidium, miscellaneous 7440-21-3,  
 Silicon, miscellaneous 7440-23-5, Sodium, miscellaneous  
 7440-28-0D, Thallium, compds. 7440-29-1, Thorium, miscellaneous  
 7440-31-5D, Tin, org. compds. 7440-32-6, Titanium, properties  
 7440-36-0, Antimony, miscellaneous 7440-36-0D, Antimony, inorg.  
 and org. compds. 7440-37-1, Argon, miscellaneous 7440-38-2,  
 Arsenic, miscellaneous 7440-39-3, Barium, miscellaneous  
 7440-39-3D, Barium, alloys 7440-39-3D, Barium, compds.  
 7440-41-7, Beryllium, miscellaneous 7440-41-7D, Beryllium, compds.  
 7440-43-9D, Cadmium, compds. 7440-44-0, Carbon, miscellaneous  
 7440-45-1, Cerium, miscellaneous 7440-46-2, Cesium, miscellaneous  
 7440-55-3, Gallium, miscellaneous 7440-58-6, Hafnium,  
 miscellaneous 7440-59-7, Helium, miscellaneous 7440-61-1,  
 Uranium, miscellaneous 7440-63-3, Xenon, miscellaneous  
 7440-66-6, Zinc, miscellaneous 7440-67-7, Zirconium, miscellaneous  
 7440-70-2, Calcium, miscellaneous 7440-70-2D, Calcium, alloys  
 7446-09-5, Sulfur dioxide, miscellaneous 7446-11-9, Sulfur  
 trioxide, miscellaneous 7446-14-2, Lead sulfate 7446-18-6,  
 Thallium sulfate 7446-70-0, Aluminum chloride (AlCl<sub>3</sub>),  
 miscellaneous 7487-94-7, Mercuric chloride, miscellaneous  
 7488-56-4, Selenium disulfide 7521-80-4, Butyltrichlorosilane  
 7550-45-0, Titanium tetrachloride, miscellaneous 7570-26-5,  
 1,2-Dinitroethane 7572-29-4, Dichloroacetylene 7578-36-1  
 7580-67-8, Lithium hydride 7601-89-0, Sodium perchlorate  
 7601-90-3, Perchloric acid, miscellaneous 7616-94-6, Perchloryl  
 fluoride 7631-89-2, Sodium arsenate 7631-99-4, Sodium nitrate,  
 miscellaneous 7632-00-0, Sodium nitrite 7632-51-1, Vanadium  
 tetrachloride 7637-07-2, Boron trifluoride, miscellaneous  
 7645-25-2, Lead arsenate 7646-69-7, Sodium hydride  
 RL: ADV (Adverse effect, including toxicity); PEP (Physical,  
 engineering or chemical process); BIOL (Biological study); PROC  
 (Process)

(packaging and transport of, stds. for)

IT 7646-78-8, Stannic chloride, miscellaneous 7646-85-7, Zinc  
 chloride, miscellaneous 7646-93-7, Potassium hydrogen sulfate  
 7647-01-0, Hydrogen chloride, miscellaneous 7647-18-9, Antimony  
 pentachloride 7647-19-0, Phosphorus pentafluoride 7664-38-2,  
 Phosphoric acid, miscellaneous 7664-38-2D, Phosphoric acid, esters  
 7664-39-3, Hydrogen fluoride, miscellaneous 7664-41-7, Ammonia,  
 miscellaneous 7664-93-9, Sulfuric acid, miscellaneous 7681-38-1,  
 Sodium hydrogen sulfate 7681-49-4, Sodium fluoride, miscellaneous  
 7681-52-9, Sodium hypochlorite 7697-37-2, Nitric acid,  
 miscellaneous 7704-34-9, Sulfur, miscellaneous 7705-07-9D,  
 Titanium trichloride, mixts. 7705-08-0, Ferric chloride,  
 miscellaneous 7718-98-1, Vanadium trichloride 7719-09-7, Thionyl  
 chloride 7719-12-2, Phosphorus trichloride 7722-64-7, Potassium  
 permanganate 7722-84-1, Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>), miscellaneous  
 7723-14-0, Phosphorus, miscellaneous 7726-95-6, Bromine,  
 miscellaneous 7727-15-3, Aluminum bromide 7727-18-6, Vanadium  
 oxytrichloride 7727-21-1, Potassium persulfate 7727-37-9,  
 Nitrogen, miscellaneous 7727-37-9D, Nitrogen, mixts. with rare

gases 7727-54-0, Ammonium persulfate 7738-94-5, Chromic acid (H<sub>2</sub>CrO<sub>4</sub>) 7756-94-7, Triisobutylene 7757-79-1, Potassium nitrate, miscellaneous 7758-01-2, Potassium bromate 7758-09-0, Potassium nitrite 7758-19-2, Sodium chlorite 7758-94-3, Ferrous chloride 7761-88-8, Silver nitrate, miscellaneous 7773-03-7, Potassium bisulfite 7775-09-9, Sodium chlorate 7775-14-6, Sodium dithionite 7778-39-4, Arsenic acid 7778-44-1, Calcium arsenate 7778-54-3, Calcium hypochlorite 7778-66-7 7778-74-7, Potassium perchlorate 7779-86-4, Zinc dithionite 7779-88-6, Zinc nitrate 7782-39-0, Deuterium, miscellaneous 7782-41-4, Fluorine, miscellaneous 7782-44-7, Oxygen, miscellaneous 7782-44-7D, Oxygen, mixts. with rare gases 7782-49-2, Selenium, miscellaneous 7782-50-5, Chlorine, miscellaneous 7782-65-2, Germane 7782-78-7, Nitrosylsulfuric acid 7782-79-8D, Hydrazoic acid, copper complexes 7782-99-2, Sulfurous acid, miscellaneous 7783-06-4, Hydrogen sulfide, miscellaneous 7783-07-5, Hydrogen selenide (H<sub>2</sub>Se) 7783-08-6, Selenic acid 7783-33-7 7783-41-7, Oxygen difluoride 7783-54-2, Nitrogen trifluoride 7783-56-4, Antimony trifluoride 7783-60-0, Sulfur tetrafluoride 7783-61-1, Silicon tetrafluoride 7783-66-6, Iodine pentafluoride 7783-70-2, Antimony pentafluoride 7783-79-1, Selenium hexafluoride 7783-80-4, Tellurium hexafluoride 7783-81-5, Uranium hexafluoride 7783-82-6, Tungsten hexafluoride 7783-91-7, Silver chlorite 7784-08-9 7784-21-6, Aluminum hydride 7784-30-7, Aluminum phosphate 7784-42-1, Arsine 7784-46-5, Sodium arsenite 7786-30-3D, Magnesium chloride (MgCl<sub>2</sub>), mixt. with chlorates 7787-36-2, Barium permanganate 7787-41-9, Barium selenate 7787-71-5, Bromine trifluoride 7788-97-8, Chromic fluoride 7789-09-5, Ammonium dichromate 7789-18-6, Cesium nitrate 7789-21-1, Fluorosulfonic acid 7789-23-3, Potassium fluoride 7789-29-9, Potassium bifluoride 7789-30-2, Bromine pentafluoride 7789-38-0, Sodium bromate 7789-59-5, Phosphorus oxybromide 7789-60-8, Phosphorus tribromide 7789-61-9, Antimony tribromide 7789-69-7, Phosphorus pentabromide 7789-78-8, Calcium hydride 7790-59-2 7790-69-4, Lithium nitrate 7790-91-2, Chlorine trifluoride 7790-93-4, Chloric acid 7790-94-5, Chlorosulfonic acid 7790-98-9, Ammonium perchlorate 7790-99-0, Iodine monochloride 7791-10-8, Strontium chloride 7791-23-3, Selenium oxychloride 7791-25-5, Sulfuryl chloride 7791-27-7, Disulfuryl chloride 7803-51-2, Phosphine 7803-52-3, Stibine 7803-54-5, Magnesium diamide 7803-55-6, Ammonium metavanadate 7803-57-8, Hydrazine hydrate 7803-62-5, Silane, miscellaneous 7803-63-6, Ammonium hydrogen sulfate 8004-09-9 8006-19-7, Amatol 8006-28-8, Soda lime 8007-56-5, Nitrohydrochloric acid 8007-58-7 8012-74-6, London Purple 8014-95-7, Fuming sulfuric acid 8049-17-0, Ferrosilicon 8050-88-2, Celluloid 8063-77-2 8065-53-0, Hexolite 8066-33-9, Pentolite 8070-50-6 9003-53-6, Polystyrene 9004-70-0, Collodion 9056-38-6, Nitrostarch 9080-17-5, Ammonium polysulfide 10022-31-8, Barium nitrate 10024-97-2, Nitrogen oxide (N<sub>2</sub>O), properties 10025-78-2, Trichlorosilane 10025-85-1, Nitrogen trichloride 10025-87-3, Phosphorus oxychloride 10025-91-9, Antimony trichloride 10026-04-7, Silicon tetrachloride 10026-11-6, Zirconium tetrachloride 10026-13-8, Phosphorus pentachloride 10031-13-7 10031-87-5, 2-Ethylbutyl acetate 10034-81-8, Magnesium perchlorate 10034-85-2, Hydrogen iodide 10035-10-6, Hydrogen bromide, miscellaneous 10039-54-0, Hydroxylamine sulfate 10042-76-9, Strontium nitrate 10045-94-0, Mercuric nitrate 10049-04-4, Chlorine dioxide 10099-74-8, Lead nitrate 10101-50-5 10102-06-4, Uranyl nitrate 10102-12-2, Selenium nitride 10102-18-8, Sodium selenite 10102-43-9, Nitric

oxide, miscellaneous 10102-44-0, Nitrogen dioxide, miscellaneous  
 10102-49-5, Ferric arsenate 10102-50-8, Ferrous arsenate  
 10103-50-1, Magnesium arsenate 10118-76-0 10124-37-5, Calcium  
 nitrate 10124-48-8, Mercury ammonium chloride 10124-50-2,  
 Potassium arsenite 10137-74-3, Calcium chlorate 10192-29-7,  
 Ammonium chlorate 10241-05-1, Molybdenum pentachloride  
 10256-53-8, Methanamine, compd. with trinitromethane, miscellaneous  
 10294-33-4, Boron tribromide 10294-34-5, Boron trichloride  
 10306-83-9 10326-21-3, Magnesium chlorate 10326-24-6  
 10361-95-2, Zinc chlorate 10377-60-3, Magnesium nitrate  
 10377-66-9, Manganese nitrate 10415-75-5, Mercurous nitrate  
 10421-48-4, Ferric nitrate 10431-47-7 10544-63-5, Ethyl  
 crotonate 11069-19-5, Dichlorobutene 11071-47-9, Isooctene  
 11099-22-2 11105-16-1, Zirconium hydride 11122-26-2 11135-81-2  
 11138-49-1, Sodium aluminate 11140-68-4, Titanium hydride  
 12001-29-5, Chrysotile 12002-19-6, Mercury nucleate 12002-48-1,  
 Trichlorobenzene 12030-88-5, Potassium superoxide 12031-80-0,  
 Lithium peroxide 12033-49-7, Nitrogen trioxide 12034-12-7,  
 Sodium superoxide 12057-74-8, Magnesium phosphide (Mg<sub>3</sub>P<sub>2</sub>)  
 12125-01-8, Ammonium fluoride 12135-76-1, Ammonium sulfide  
 12136-15-1, Mercury nitride 12164-94-2, Ammonium azide  
 12167-20-3, Nitrocresol 12172-67-7, Actinolite 12401-70-6,  
 Potassium monoxide 12401-86-4, Sodium monoxide 12427-38-2, Maneb  
 12440-42-5, Tin phosphide (Sn<sub>3</sub>P<sub>4</sub>) 12504-16-4, Strontium phosphide  
 (Sr<sub>3</sub>P<sub>2</sub>) 12627-52-0, Antimony sulfide 12627-52-0D, Antimony  
 sulfide, mixt. with chlorates 12640-89-0, Selenium oxide  
 12653-71-3, Mercury oxide 12737-18-7, Calcium silicide  
 12751-03-0, Cordite 12771-08-3, Sulfur chloride 12789-46-7, Amyl  
 acid phosphate 13092-75-6, Silver acetylide 13138-45-9  
 13225-10-0,  $\alpha$ -Methylglucoside tetranitrate 13319-75-0, Boron  
 trifluoride dihydrate 13410-01-0, Sodium selenate 13424-46-9,  
 Lead azide 13426-91-0, Cupriethylenediamine 13437-80-4, Mercuric  
 arsenate 13444-85-4, Nitrogen triiodide 13446-10-1, Ammonium  
 permanganate 13446-48-5, Ammonium nitrite 13450-97-0, Strontium  
 perchlorate 13453-30-0, Thallium chloride 13463-39-3, Nickel  
 carbonyl 13463-40-6, Iron pentacarbonyl 13464-33-0, Zinc  
 arsenate 13464-58-9D, Arsenous acid, copper complexes  
 13465-73-1, Bromosilane 13465-95-7, Barium perchlorate  
 13472-08-7 13473-90-0, Aluminum nitrate  
 RL: ADV (Adverse effect, including toxicity); PEP (Physical,  
 engineering or chemical process); BIOL (Biological study); PROC  
 (Process)

(packaging and transport of, stds. for)

IT 13477-00-4, Barium chlorate 13477-10-6, Barium hypochlorite  
 13477-36-6, Calcium perchlorate 13520-83-7, Uranyl nitrate  
 hexahydrate 13537-32-1, Fluorophosphoric acid 13548-38-4,  
 Chromium nitrate 13597-54-1, Zinc selenate 13597-99-4, Beryllium  
 nitrate 13598-36-2, Phosphonic acid 13637-63-3, Chlorine  
 pentafluoride 13637-76-8, Lead perchlorate 13718-59-7  
 13746-89-9, Zirconium nitrate 13762-51-1, Potassium borohydride  
 13766-44-4, Mercury sulfate 13769-43-2, Potassium metavanadate  
 13770-96-2, Sodium aluminum hydride 13774-25-9 13779-41-4,  
 Difluorophosphoric acid 13780-03-5, Calcium bisulfite  
 13823-29-5, Thorium nitrate 13840-33-0, Lithium  
 hypochlorite 13840-33-0D, Lithium hypochlorite, mixts.  
 13843-59-9, Ammonium bromate 13863-88-2, Silver azide  
 13967-90-3, Barium bromate 13973-87-0, Bromine azide 13973-88-1,  
 Chlorine azide 13987-01-4, Tripropylene 14014-86-9 14019-91-1,  
 Calcium selenate 14293-73-3 14448-38-5, Hyponitrous acid  
 14519-07-4, Zinc bromate 14519-17-6, Magnesium bromate

14546-44-2, Hydrazine azide 14567-73-8, Tremolite 14644-61-2,  
 Zirconium sulfate 14666-78-5, Diethylperoxydicarbonate  
 14674-72-7, Calcium chlorite 14696-82-3, Iodine azide (I(N3))  
 14977-61-8 15195-06-9 15245-44-0, Lead trinitroresorcinate  
 15347-57-6, Lead acetate 15457-98-4 15512-36-4, Calcium  
 dithionite 15545-97-8, 2,2'-Azodi(2,4-dimethyl-4-  
 methoxyvaleronitile) 15598-34-2, Pyridine perchlorate  
 15718-71-5, Ethylenediamine diperchlorate 15825-70-4, Mannitol  
 hexanitrate 15875-44-2, Methylamine perchlorate 16215-49-9,  
 Di-n-butyl peroxydicarbonate 16229-43-9, Vanadyl sulfate  
 16339-86-9 16646-35-8 16721-80-5, Sodium hydrosulfide  
 16753-36-9, Copper acetylidyde 16853-85-3, Lithium aluminum hydride  
 16871-71-9, Zinc fluorosilicate 16871-90-2, Potassium  
 fluorosilicate 16872-11-0 16893-85-9, Sodium fluorosilicate  
 16901-76-1, Thallium nitrate 16919-19-0, Ammonium fluorosilicate  
 16940-66-2, Sodium borohydride 16940-81-1, Hexafluorophosphoric  
 acid 16941-12-1, Chloroplatinic acid 16949-15-8, Lithium  
 borohydride 16949-65-8, Magnesium fluorosilicate 16961-83-4,  
 Fluorosilicic acid 16962-07-5, Aluminum borohydride 17014-71-0,  
 Potassium peroxide 17068-78-9, Anthophyllite 17462-58-7,  
 sec-Butyl chloroformate 17639-93-9, Methyl-2-chloropropionate  
 17702-41-9, Decaborane 17861-62-0 18130-44-4, Titanium sulfate  
 18414-36-3 18810-58-7, Barium azide 19159-68-3 19287-45-7,  
 Diborane 19287-45-7D, Diborane, mixts. 19624-22-7, Pentaborane  
 20062-22-0 20236-55-9, Barium stypnate 20600-96-8 20816-12-0,  
 Osmium tetroxide 20820-44-4 20859-73-8, Aluminum phosphide  
 21351-79-1, Cesium hydroxide (Cs(OH)) 21569-01-7 21723-86-4  
 21985-87-5, Pentanitroaniline 22128-62-7,  
 Chloromethylchloroformate 22750-93-2, Ethyl perchlorate  
 22751-24-2 22826-61-5 23414-72-4, Zinc permanganate  
 23745-86-0, Potassium fluoroacetate 24167-76-8, Sodium phosphide  
 24468-13-1, 2-Ethylhexylchloroformate 24884-69-3 25013-15-4,  
 Vinyl toluene 25109-57-3 25134-21-8 25136-55-4,  
 Dimethyldioxane 25154-42-1, Chlorobutane 25154-54-5,  
 Dinitrobenzene 25155-15-1, Cymene 25167-20-8, Tetrabromoethane  
 25167-67-3, Butylene 25167-70-8, Diisobutylene 25167-80-0,  
 Chlorophenol 25168-05-2, Chlorotoluene 25265-68-3,  
 Methyltetrahydrofuran 25321-14-6, Dinitrotoluene 25322-01-4,  
 Nitropropane 25322-20-7, Tetrachloroethane 25323-30-2,  
 Dichloroethylene 25339-56-4, Heptene 25340-17-4, Diethylbenzene  
 25377-72-4, n-Amylene 25496-08-6, Fluorotoluene 25497-28-3,  
 Difluoroethane 25497-29-4, Chlorodifluoroethane 25513-64-8  
 25550-53-2 25550-55-4, Dinitrosobenzene 25550-58-7,  
 Dinitrophenol 25550-58-7D, Dinitrophenol, salts 25567-67-3,  
 Chlorodinitrobenzene 25567-68-4, Chloronitrotoluene 25639-42-3,  
 Methylcyclohexanol 25721-38-4, Lead picrate 25917-35-5, Hexanol  
 26134-62-3, Lithium nitride 26140-60-3D, Terphenyl, halo derivs.  
 26249-12-7, Dibromobenzene 26471-56-7, Dinitroaniline  
 26471-62-5, Toluene diisocyanate 26506-47-8, Copper chlorate  
 26571-79-9 26618-70-2 26628-22-8, Sodium azide 26638-19-7,  
 Dichloropropane 26645-10-3 26760-64-5, Isopentene 26762-93-6  
 26914-02-3, Iodopropane 26915-12-8, Toluidine 26952-23-8,  
 Dichloropropene 26952-42-1, Trinitroaniline 27134-26-5,  
 Chloroaniline 27134-27-6, Dichloroaniline 27137-85-5,  
 Dichlorophenyltrichlorosilane 27152-57-4 27176-87-0,  
 Dodecylbenzenesulfonic acid 27195-67-1, Dimethylcyclohexane  
 27215-10-7 27236-46-0, Isohexene 27254-36-0, Nitronaphthalene  
 27458-20-4, Butyltoluene 27978-54-7, Hydrazine perchlorate  
 27986-95-4 27987-06-0, Trifluoroethane 28260-61-9,  
 Trinitrochlorobenzene 28300-74-5, Antimony potassium tartrate

28324-52-9, Pinane hydroperoxide 28479-22-3 28653-16-9  
28679-16-5, Trimethylhexamethylenediisocyanate 28805-86-9,  
Butylphenol 29191-52-4, Anisidine 29306-57-8 29790-52-1,  
Nicotine salicylate 29903-04-6 29965-97-7, Cyclooctadiene  
30236-29-4, Sucrose octanitrate 30525-89-4, Paraformaldehyde  
30553-04-9, Naphthylthiourea 30586-10-8, Dichloropentane  
30586-18-6, Pentamethylheptane 31058-64-7 31212-28-9,  
Nitrobenzenesulfonic acid 33453-96-2 33864-17-4 34216-34-7,  
Trimethylcyclohexylamine 35296-72-1, Butanol 35860-50-5,  
Trinitrobenzoic acid 35860-51-6, Dinitroresorcinol 35884-77-6,  
Xylyl bromide 36472-34-1, Chloropropene 37020-93-2, Mercury  
cyanide (Hg(CN)) 37187-22-7, Acetyl acetone peroxide 37206-20-5,  
Methyl isobutyl ketone peroxide 37273-91-9, Metaldehyde  
37320-91-5, Mercury iodide 37368-10-8, Aluminum vanadium oxide  
38139-71-8, Bromide chloride 38232-63-2, Mercurous azide  
38483-28-2, Methylene glycol dinitrate 39377-49-6, Copper cyanide  
39377-56-5, Lead sulfide 39404-03-0, Magnesium silicide  
39409-64-8, TVOPA 39432-81-0 39455-80-6, Ammonium sodium  
vanadium oxide 40058-87-5, Isopropyl-2-chloropropionate  
41195-19-1 41587-36-4, Chloronitroaniline 42296-74-2, Hexadiene  
43133-95-5, Methylpentane 50815-73-1 50874-93-6 51006-59-8  
51023-22-4, Trichlorobutene 51064-12-1 51312-23-3, Mercury  
bromide 51317-24-9, Lead nitroresorcinate 51325-42-9, Copper  
selenite 51845-86-4, Ethyl borate 52181-51-8 53014-37-2,  
Tetranitroaniline 53408-91-6, Mercury thiocyanate 53422-49-4  
53569-62-3 53839-08-0 53906-68-6 54141-09-2, 1,4,-Butynediol  
54413-15-9, Tritonal 54727-89-8 54958-71-3 55510-04-8,  
Dinitroglycoluril 55810-17-8  
RL: ADV (Adverse effect, including toxicity); PEP (Physical,  
engineering or chemical process); BIOL (Biological study); PROC  
(Process)  
(packaging and transport of, stds. for)

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